JOURNAL OF DENTAL EDUCATION

Volume 18 MAY, 1954 Number 3

A Quarterly for the Dental Teacher

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JOURNAL of Dental Education

A Quarterly for the Dental Teacher

Volume 18 **MAY, 1954** **Number 3**

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JOURNAL of Dental Education

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If I have done any deed worthy of remembrance, that deed will be my eternal monument. If I have done no worthy deed, no monument can preserve my memory.

AGESILAUS, KING OF SPARTA (477-401 B.C.)

REORIENTATION OF BIOCHEMISTRY FOR THE DENTAL SCHOOL CURRICULUM

ERNEST BEERSTECHER, JR., B.S., M.A., Ph.D.,[1] *Houston*

While much has appeared in the literature of the past several years concerning the philosophy of the role of basic sciences in dental education, more information is badly needed in order to combat effectively the evils that are generally agreed to exist in most preclinical training programs. As evidence of this, many dental students have the distinct impression that basic sciences in general have been incorporated into their training programs as a series of hurdles to weed out the luckless and to make the acquisition of a degree in dentistry as discouraging a process as is possible. An impartial survey of the courses in basic science now given in the dental schools of the United States would probably show that such impressions are frequently not without justification. This is certainly true in the case of biochemistry, and is one of the major problems that stand in the way of effective teaching of the subject at this time.

The Reason for Biochemistry

Perhaps the primary question that must be answered is whether or not there *is* any real reason for the dental student to study biochemistry. Many instructors neglect to state the importance of the subject, and the vast majority of clinical instructors and practitioners give the student little reason to suspect that there is any real practical value to it. It is manifestly possible, indeed, to perform operative dentistry, dental surgery, and prosthesis with no conscious knowledge of the subject. The objectives of instruction in physiological chemistry as enumerated in the Report of the Curriculum Committee of the American Association of Dental Schools (1935) are both broad and nebulous, and offer little or no immediate reward to the student, particularly since there are, in general practice, few "clinical chemical examinations which the dentist may find it necessary to utilize." The best reason that we are able to find at the present time for the teaching of biochemistry is that it can facilitate the more rapid acquisition of clinical wisdom. A sound knowledge of dental biochemistry will, in one sense and in a certain defined area of clinical activity, substitute for considerable amounts of clinical

[1]Associate Professor of Biochemistry, University of Texas, School of Dentistry.

experience that might only be gained by years of practice. Persons with extended clinical experience will gain considerable training in biochemistry along the way, although it may not be conscious, and indeed is frequently denied by them. Nevertheless, many senior practitioners who vigorously question the time spent in the dental curriculum in biochemistry actually apply biochemical principles in their work daily without realizing that such principles are biochemistry. Herein lies one of the greatest anomalies of the situation, that many professional persons have only a very limited idea of what biochemistry is, and that idea is very frequently wrong.

In order to remedy this situation among at least the newer members of the profession, it would seem that any biochemistry course should devote a considerable amount of time toward the definition of its scope and the justification of its existence. As an approach toward this, the following ten points, presented to the student in the first lecture, have proven to be valuable:

1. The chemical properties of teeth should be understood in order to work with them *effectively*.
2. The growth and maturation of teeth is a chemical process that should be understood in order to be able to encourage *proper* tooth development.
3. *Safe* and *effective* treatment of periodontal disease depends to a considerable extent upon an understanding of the chemistry of the soft tissues of the oral cavity.
4. Caries is a chemical process that can best be understood and most *effectively* controlled with the aid of the application of chemical principles.
5. *Effective* teaching of oral hygiene depends upon an understanding of the chemistry of the saliva and the oral cavity.
6. Dental medicine and therapeutics is based upon a *thorough* understanding of the chemistry of drug action.
7. An understanding of clinical chemistry is necessary for the *accurate* interpretation of certain laboratory tests that should be conducted in conjunction with oral surgery and diagnoses.
8. An understanding of human biochemistry is necessary to evaluate *intelligently* the current literature of dentistry, and to be able to read and to apply future advances in clinical dentistry.
9. A thorough knowledge of biochemistry is essential to a *real* understanding of dental physiology, pharmacology, bacteriology, pathology and anatomy.
10. A background in biochemistry provides a part of the professional background of a dentist—it makes possible effective communication with members of other healing professions, and by the understanding of life processes that it imparts, it increases the value of the dentist to his community.

The Content of Biochemistry

In order to fulfill the enumerated purposes of biochemistry in the dental curriculum, a great deal is required of a course that would not

be required in a similar course given in a medical or liberal arts school. This raises the enigma that must confront each instructor of biochemistry in a dental school, whether to teach a conventional course, giving much background upon which the student can, himself, build practical knowledge at a later date, or to teach an applied course, leaving the more basic theoretical material for those who may wish to acquire it independently by some other means. Attempts at compromise have generally proven unsuccessful, and confusing to the student.

The most satisfactory approach to this situation of which the author is aware consists in organizing the course in biochemistry as a course in dentistry or a dental survey course, and weaving the biochemical material into this fabric. In this manner the student is aware that he is studying the primary material of his chosen profession, and reacts with some avidity to the subject. The approach does place a tremendous burden upon the instructor, however, in that it requires considerable ingenuity in presenting the chemical material without disturbing the general consciousness of dental study. It will require, for instance, that the instructor be able to dissert accurately and at some length on the biochemistry of fixed multiple restorations, or the biochemistry of the periodontal membrane. It further requires that the classic sequence of subjects in physiological chemistry be thoroughly reorganized to conform with the subject at hand. Many instructors, for instance, would find it unthinkable to consider the subject of enzyme action prior to a discussion of carbohydrates, fats, and proteins. Nevertheless, this is entirely possible. Such concessions will, moreover, become increasingly essential if preclinical sciences are ever to become successfully coordinated into a single coherent course in human biology . . . the ultimate goal in basic science teaching in clinical schools. With these considerations in mind, the exact organization of a course can be approached more practically. The accompanying brief outline is one that has proven successful in our institution. Both outline and lecture materials follow subjects of dental interest, and discovery of the material of biochemistry in the outline generally necessitates careful examination of the *italicized* words.

OUTLINE OF BIOCHEMISTRY

(Numbers refer to one-hour lectures)

Part A—Chemical Composition and Growth of the Dental Structures

I. The Relationship of Biochemistry to Dentistry (1)

II. Inorganic Composition of the Teeth (2-7)

a. *Mineral* composition, pH, and buffers

b. Mineral composition of periodontal tissues
c. Mineral requirements
d. Mineral metabolism
e. Fluorides and mineral solubility

III. Chemical Biogenesis of the Teeth (8-11)
a. Involvement of *Enzymes* and their properties (2)
b. Calcification
c. Decalcification

IV. Organic Composition of the Teeth and Periodontal Tissues (12-21)
a. Significance of organic components
b. *Protein* components
c. *Lipid* components
d. Comparison of natural and synthetic polymers

V. Summary of Chemical Composition and Growth of Dental Structures (22)

Part B—Biochemical Basis of Oral Pathology

VI. The Carious Process (23-29)
a. General, carbohydrate metabolism
b. *Carbohydrates* in the carious process
c. Acidogenesis and its prevention
d. Composition of the saliva
e. Periodontitis

VII. Relationship of Blood Constituents to Dental Disorders (30-37)
a. Tooth pigmentation, bile
b. *Endocrines* and *basal metabolism*
c. *Blood* and its disorders, clotting of blood
d. *Excretion*

VIII. Biochemical properties of Nerve and Muscle Tissue (38-39)
a. Structure and function

IX. Biochemical Basis of Dental Therapeutics (40-42)
a. Drug action
b. Antibiotics
c. Anesthesia

X. Course Summary (43-44)
a. Body as a functioning biochemical unit
b. The teeth as biochemical entities

Despite the vast amount of dental material presented in the invariably limited time for the course, students have been found to have acquired as much basic biochemistry as in more classic courses. The reason for this is believed to center around the greatly increased interest that this presentation of the material evokes.

The Biochemical Laboratory

A cursory survey shows that laboratory courses in biochemistry for dental students consist largely of classic courses modified by the addi-

tion of a few experiments on saliva and tooth composition. Lack of popularity of such courses is somewhat justified in view of the many tests and other procedures that will obviously be rapidly forgotten because of their complete uselessness to the dental profession. One can hardly blame the student for regretting the time spent in performing six different types of carbohydrate tests on twelve different exotic sugars, when the time available for dental physics and dental anatomy is already far too short.

It is our belief that the solution to this problem rests in a realization that laboratory time presents virtually the only opportunity in preclinical training to gain experience in the application of biochemical principles to dental practice. For this reason the assigned experiments should be few in number, and should consist only of those that teach important tests or procedures. These, in addition, should be conducted in such a manner as to demonstrate clearly their clinical significance. Such work should not in any case occupy over a third of the total available laboratory time. The balance of the time must be spent in a much more vital and difficult endeavor, that of teaching the student how to learn, to think scientifically, and to discover. In the final analysis, each patient in a dental chair represents a different problem, with many variables combining to make effective dental practice a continuous program of applied clinical research. It is therefore essential that each student become an original investigator, and learn from the earliest days of his education the method of scientific investigation. Especially well trained for this are the members of the basic science faculty, much of whose lives have been devoted to research activities.

Activation of such a program in our institution has been achieved through a system of projects in dental research. Individuals, or groups of students, are assigned various different problems in dental biochemistry, for which there exist no solution in the literature at this time. It is felt that an essential element of the program is that the projects be genuine ones, rather than laboratory exercises which duplicate published work, since there are few motivations in the world more powerful than the creative instinct, and when this drive is put to work in the educational process, the student starts to work for himself, and not for the instructor. Typical of the projects that have proven satisfactory for students with even the most limited background are:

a. The effect of diet on the pH and buffering capacity of saliva.
b. The determination of the calcium-binding properties of various foods.
c. Putrefactive bacteria and their effect on salivary calculus.
d. Retention of starchy foods in various parts of the oral cavity.

e. Biochemical aspects of airbrasive compounds.
f. Amino acid content of human teeth.
g. Relation of age and sex to salivary constitution.
h. Food selection tests and their relationship to dental health.
i. Solubility of enamel in bacterial acids.

There are those who will scoff at the ability of a freshman dental student to do creditable research. Experience has shown, however, that such pessimism is unwarranted, and this type of program is also proving successful in several of the major medical schools of this country. In some cases the project may not achieve fruition . . . this is the way of all research. Many mistakes will be made by all . . . this is the way that we learn, and no investigator can avoid them. The purpose of the entire program is not to obtain new information or publications, but rather to teach by stimulation of the investigative technique, and for this reason, success is inevitable.

In actual practice, it has been found expedient to assign research projects, with the provision that the students may select some other of their own choosing if they so desire and the plan seems feasible. A considerable amount of time is then spent in instruction on the use of the library, index and abstract journals, and the methods of literature research. The workers are then required to complete a thorough literature search on their problem, and to find for themselves the approach and techniques that they will employ. Guidance is provided, but little more, for the student in planning his program must employ his own ingenuity, and in discovering that he is capable of this, he will reap one of his greatest rewards.

At the termination of the available time for research, the student is expected to compile and evaluate his results, and to submit them in the form of a research paper ready for publication in one of the more important clinical journals. Time is also provided for the student to deliver his paper before the assembled class, and for discussion of the work by the class. Experience has shown that this provides valuable training in the development of critical abilities, and even groups that are normally unresponsive in class have opened up under these circumstances to a remarkable degree. Certainly, attendance at dental meeetings and scientific assemblies is an integral part of the activities of any dentist who would keep abreast of his field, and yet training for such activity is most generally neglected. By assigning the majority of the biochemistry laboratory time to these types of activities, it is felt that the student develops capacities, that cannot be cultivated well in other places in the curriculum, and qualities that will serve him well in his clinical practice.

THE CANCER KNOWLEDGE OF DENTAL STUDENTS AND PRACTICING DENTISTS[1]

LEONARD W. TOWNER, Ph.D.[2]
DONALD ROSS GREEN, B.A.[3]

During the last five years the United States Public Health Service through the National Cancer Institute has carried on an intensive program to improve the recognition and treatment of cancer. One of the long-range goals of this program has been the more effective participation of the dental profession in the control of cancer. To attain this goal the National Cancer Institute has provided grants-in-aid to assist dental schools throughout the country in their cancer teaching so that their graduates would be better equipped to meet the cancer problem.

One must ask, therefore, whether the students now graduating from dental schools are better armored with the necessary knowledge of cancer than are those dentists who have been in practice for some time. Of course, many opinions are expressed to the effect that students are better trained in cancer now than in the past, but factual evidence to demonstrate how their knowledge compares with that of men in the field has been seriously lacking.

An excellent opportunity to uncover some of the facts of the case has come through the use of the "Examination for Dental Students in the Subject Matter of Cancer."[4,5] This examination contains 90 items submitted by dental school faculties throughout the United States and is comprehensive of the subject of cancer. This Cancer Knowledge Examination has been administered annually to all the students in practically all of the dental schools in the United States since 1950. At the same time several groups of practicing dentists have been tested with the examination. A comparison of the performance of these students and postgraduates on the examination should reveal their relative knowledge of cancer.

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[1]This study was carried out in the Cancer Research Institute of the University of California by the Cancer Teaching Project which is supported by a grant from the National Cancer Institute, U. S. Public Health Service.

[2]Assistant Research Oncologist (Medical Education), University of California Medical Center, San Francisco, California.

[3]Statistician, University of California Medical Center, San Francisco, California.

[4]Bierman, Howard R.; McClelland, James N.; Hazlet, John W.; and Galloway, David W.: "A National Comprehensive Achievement Examination for Dental Students in the Subject Matter of Cancer," *Oral Surgery, Oral Medicine, and Oral Pathology*, vol. 4, No. 8, August, 1951, pages 1048-1056.

[5]Bierman, Howard R.; Towner, Leonard W.; Galloway, David W.; and Hazlet, John W.: *Cancer Learning in the Dental School*, 1954, Berkeley: University of California Press, xii + 137 pages.

In 1952 the examination was administered to 2180 senior dental students in 31 dental schools throughout the United States. It was also administered on the first day of class to a group of 25 practicing dentists attending a refresher course in cancer at a midwestern school of dentistry.[6] A second group of 44 pedodontists was tested at a meeting of a Pedodontic Society on the Pacific Coast. Neither group of dentists had any forewarning that it was to be tested. Because of the marked similarity of results for the two postgraduate groups the data for the two were combined for the analysis which follows.

The senior students in 1952 achieved a national mean score of 57.9 on the 90-item examination, while the total group of 69 practicing dentists obtained a mean score of 44.5. The difference between the two means was significant at $P = .01$. The mean score of the practicing dentists most nearly corresponded to the mean of 40.0 obtained for sophomore students.

Part of the difference between the mean scores resulted from the fact that only 43 of the 69 postgraduates were able to complete the examination in the standard one-hour time limit. The number of items completed in the test ranged from 90 down to 56. To offset the disadvantages placed upon those dentists unable to complete the examination, all of the scores were recomputed on the basis of the number of items attempted before the end of the allotted time. The number of items correctly answered was then converted to a percentage of those attempted. This resulted in a mean percentage score of 52.6 on attempted items for the total group of 69 dentists compared to 64.3 for the seniors. In view of the fact that the more difficult items occurred near the end of the test, the difference was decidedly in the students' favor.

The argument could be advanced that the older members of the group of practicing dentists had been away from school for such a long period that they would be unfamiliar with examinations of this sort. The function most likely to clearly represent the inadequacy of an older group of examinees would be speed as indicated by the number of items attempted before the end of the examination time limit. Therefore, the time since graduation from dental school was obtained for all the midwestern dentists and ranged from less than one year up to 35 years. An inspection of their answer sheets revealed that 12 of the 25 dentists in the midwestern group were able to attempt the full 90 items. The number of unattempted items ranged on up to 34 for one man.

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[6]The authors wish to express their appreciation to Dr. Donald Waggener of the University of Nebraska for providing the data for this group.

The correlation between years out of school for this group and number of items attempted was —.39. This shows a distinct tendency for the older men to be less able to complete the examination during the allotted time. On the other hand, the correlation between years out of school and score on those items that were attempted in the time limit was —.38. Thus, the slowness, and indirectly the unfamiliarity with examinations, of the older dentists could not account for the fact that the practicing dentists did poorly compared to the senior students.

Further evidence that familiarity with examinations was not the major factor in the superior performance of the students came from data on eight members of the total practicing group who had been tested as senior dental students in either 1951 or 1952 on the same examination. As seniors these men achieved a mean score of 61 compared to the national group average of 57. Tested as practicing dentists about one year after graduation their mean score had fallen to 52, or down to the level of the average junior student.

In order to discover the areas of greatest deficiency for the postgraduate dentists, the percentage of students and percentage of postgraduates who answered correctly was determined for each item. The percentage for the postgraduates was based upon only the number who attempted the item during the time limit. Out of the 90 items in the test there was only one on which the practicing dentists were correct significantly more often than the seniors at $P = .01$. This question merely asked for the sex-ratio for oral cancer. There were 33 items on which the seniors were significantly higher at $P = .01$, and 56 on which the difference was not significant. In actuality there were only ten items in the test on which the practicing dentists surpassed the seniors by any amount.

An investigation of those items on which the seniors were significantly higher revealed that in no way were they different from the items on which there was no significant difference. These two sets of items were equivalent in their emphasis on textbook and practical content; diagnosis, characteristics, and treatment; and various anatomical sites. One must conclude that the deficiencies of the practicing dentists were general in nature and could not be blamed upon the material covered by the questions.

On the basis of these data two tentative conclusions must be drawn. First, practicing dentists know less about cancer than senior dental students; and second, within a short time after graduation dentists forget much of what they have learned. The drop in the performance of the

recent graduates suggests that what they learned in school had limited usefulness in practice, or that they had not kept themselves refreshed in the subject of cancer, or that the methods of dental school teaching were such that it was difficult to remember the material outside of school. Of course such hypotheses must be tempered by the realization that the sample of recent graduates was limited.

Many practicing dentists are likely to state that the deficiencies portrayed here result from the fact that the typical dentist sees only about two cancers a year. Perhaps it would be more appropriate to say that he recognizes only two. Nevertheless, a dentist's knowledge of cancer should not rest solely upon the particular cases he has recognized in his own practice, but most certainly should be the result of reading, refresher courses, discussion, and all the other means of communicating knowledge within the profession. He should be prepared to adequately fulfill all his responsibilities in the cancer control program. The present evidence suggests that recent graduates are better prepared than earlier graduates for the tasks at hand.

Play Your Part

To-day is your day and mine,
The only day we have,
The day in which we play our part.
What our part may signify in the great world we may not understand,
But we are here to play it, and now is our time.

—David Starr Jordan

THE OBJECTIVES OF THE EDUCATION OF A DENTIST[1]

WENDELL L. WYLIE, D.D.S., M.S.,[2] *San Francisco*

The program of this conference provides for someone to state: "The Objectives of the Education of a Dentist." In roundabout fashion I am reminded of a friend who was so successful as a basketball coach that the newspaper reporters wanted him to reveal his "system." He met this inquiry by saying that it all came from reading the basketball rule book. When he came to the part about the team having the greater number of points at the end of the game being the winner, there and then he found his system. Thereafter he simply saw to it that his team had the greater number of points.

In the same spirit of genial obstinacy, one might respond to this assignment by saying "read the Dental Practice Act." But what makes copy for the sports pages does not fit other situations, and it would be bad manners to answer so tersely the question "What Are the Objectives of the Education of a Dentist?" Nevertheless, we can perhaps make this a point of departure, the simplest and most boiled-down definition with which we dare begin. It is our job, then, to give the dental student competence within the terms of the Dental Practice Act. Competence, in some professions, consists largely of what one knows. In dentistry it is a composite of what one knows about a particular field, plus what he can do. You do not want at this time a detailed bill of particulars of what a dentist must know and be able to do, because the program has other speakers dealing with the special fields of interest which, when combined, form the integrated whole which is dentistry. Having lumped together "knowing" and "doing" and called the composite "competence," I find that this outlook upon our task—to convey to the student competence within the terms of the Dental Practice Act—is a bit too narrow, however convenient it may be as a point of departure. We should re-examine the word "competence."

There are, of course, different kinds of competence. Many of you as professional men maintain an effective partnership with dental laboratory technicians, individuals who possess a high degree of competence, but whose ranks constitute a trade, not a profession. When you as professional men talk about competence, you must concede that many other

[1]Presented before the Pacific Coast Conference on Dental Teaching, Los Angeles, California, September, 1953.

[2]Professor of Orthodontics and Assistant Dean, College of Dentistry, University of California.

individuals have competence also. The difference between the dentist and the dental laboratory technician goes beyond the fact that one works in the mouth and the other does not. And so I would expand the definition of our task to a twofold one: We must teach the dental student to do competently what is expected of him under the law, but besides that we must help him *to see the implications of what he is doing*. Here, I think, is a suitable distinction between a trade and a profession. The professional man must always understand the implications of what he is doing, while the tradesman need not and many times does not. This is not a social distinction couched in snobbery, but merely a measure of the amount of responsibility which one must take up, and of which the other is relieved.

If a partial denture is attached to an isolated tooth in utter disregard of sound principles of prosthetic dentistry, the obvious implication is that there will shortly be made a new partial, with at least one more unit on it than the original carried. With this limited conception of the implications of dentistry, one might contrast more abstract but equally valid implications involving prevention, public health dentistry, and the man's responsibility as a member of the community.

How well, do you think, dental education has met its twofold task? As of September, 1953, are we entitled to congratulate ourselves on what new dental graduates know, and upon what they can do? Have we made them see the implications of what they are doing?

Although we have met primarily for the purpose of considering these questions, we owe it to ourselves to set some kind of a limit upon what rightfully might be expected of us. I sometimes wish we had the wisdom—or if not the wisdom, the time—to teach all the things alumni tell us we should have taught them when *they* were enrolled. I wish we had the powerful influence of moral suasion attributed to us by some lay people who occasionally take us to task by letter or by telephone for what they fancy to be the shortcomings of our graduates of twenty years ago. As we stake out the objectives of dental education we should consider realistically the extent to which the institution of dental education can beneficially influence all this, and the extent to which we are to be held responsible. If a man is inherently lazy, slack-witted, or unscrupulous, *even four years in a dental school* is not going to remake him entirely.

Examining the record of dental education thus far, I should say that we have done a pretty good job with respect to the first half of our task, but we have too often let the implications take care of themselves.

All but a few of the visiting alumni, returning after many years, marvel at the number of technical operations performed by the present generation of dental students, and at the skill therein demonstrated. A smaller, but nonetheless significant, number of alumni comment upon the incomparably better background in factual knowledge derived from sciences.

We are not smug when we admit that we have presented our students with an impressive array of facts to be learned and an imposing number of technics to be mastered. Have we done as well as we could, however, with the subtleties which make dentistry more than a bag of tricks?

The importance of these intangibles should be demonstrated in relation to the profession of dentistry, and this requires that there first be shown deficiencies in the profession traceable to the neglect of the intangibles, and that secondly dental education had a chance to do something about it and muffed it.

Making the usual exceptions for present company, and stipulating the necessary qualifications regarding individuals, organizations and localties who otherwise might be expected to take offense, I submit these faults which are found in too many dentists:

1. When they undertake a program of dental service for one patient, they see it as a series of isolated steps, entirely unrelated to one another.
2. Their reading of journals in dentistry and cognate fields is neglected; their purchases of books are close to nil; and they find appealing only the postgraduate courses which either promise entertainment or immediate financial return.
3. They are bored.
4. They are easily led by a single compelling personality, or they show a tendency to form clumps with other dentists, for the purpose of thanking God they are not as other men.

Dental education is partially reponsible for this. Yet there is nothing that dental education can do about it, if we look only for the right set of facts to push at the students, or for the right technical steps in which to drill them. If we care to tackle the correction of these faults, we shall have to treat dentistry as a thing of many nuances. It is a mortal sin to confuse a student unintentionally, but a little of it should be done on purpose. We owe it to them to let them see some of the switches and surprises dentistry affords, and early in the game you should let them see the shortcomings of "the one best way"—even if you invented it yourself.

If too many dentists attack the restoration of a mouth in piecemeal fashion, who is to say the pattern was not set in the dental school? We have sought methods by which departments could work together more effectively, and we have recognized that even within single de-

partments more integration is required. I regard it as unfortunate, however, that so much effort has been put into organization charts and elaborate administrative schemes that there is no time left for the easy exchange of opinion which might turn the trick.

The accusation that dentists read not enough and in other respects fail to keep up with professional advances implies that the individual dentist is content with what he already has. But I know of at least one department head who assigns a fairly long list of reading references, all of which were written by himself. Much of the instruction in dental schools is given with an aura of infallibility which seems to say that the students are getting the best available at the moment, but more than that, something which will endure unchanged through the ages. Surely this kind of teaching does much to make the dental graduate resemble the lady who has a book, and therefore does not need another.

Many of you have been asked, as I have, if dentists did not become bored with their work. I used to take offense, until I realized that lay people could not appreciate that dentistry need not be a synonym for tedium and monotony. I learned to give the soft answer, however, only when I faced the fact that many dentists *are* bored. Not long ago an alumnus visited our school in search of a stimulant for his dental society. He said that men were interested in dentistry for a while, but then got interested in roses and music. Some of my acquaintances have settled for less inspired avenues of escape. We know that boredom could be on occupational hazard in dentistry, if we allowed it to be. But do we, as teachers, do all we could to prevent it?

The monumental dullness of the lectures in the last two years is a favorite topic of complaint on the part of students in many different schools. The point of view expressed by student critics regarding didactic dullness seems sound. They contend that the senior lectures are repetitions of the junior lectures, which are in turn repetitions of the sophomore lectures, not because they represent the compass of the professor's knowledge, but because a few students in the clinic betray a lack of understanding, and this is taken to be a representative sample of the ability of the entire class. This going over and over again the same material for the least promising students makes them the most important students, for they set the pace. And at this pace many of the best students conclude that dentistry is something which leaves plenty of time for roses and music.

Let no one misconstrue this diatribe against dullness as praise for glibness, nor for the apostles of Dale Carnegie. Students will often re-

spect a teacher who is, by ordinary standards, a poor speaker. He may hedge his remarks with so many qualifications, and make so many exceptions and side excursions as to earn the contempt of those who like everything over-simplified. But out of the qualifications and exceptions he can develop a picture of dentistry as a field which required good judgment, and one which presents continuing variety of experience.

Perhaps the insularity that is demonstrated by little coteries of dentists, adherents to a single procedure to the exclusion of alternative ones, or adherents to a single individual, is something to be expected in a profession which is, by comparison, very young. If that is so, then time may be the only remedy. But universities came by the name because they were to have a universality of view, and if the university dental schools are not yet ready to combat provincialism, they could at least refrain from aiding and abetting. But there comes to mind the instance of a chapter of the junior American Dental Association which had to be straightened out by the faculty, because they were having meetings wherein guest clinicians were demonstrating techniques at variance with those taught at the school. That may be an extreme example of over-protection, but protect them we do. While the immediate example was drawn from clinical subject matter, we might expect help on this score from the teachers of basic and preclinical sciences. By devoting less time and emphasis to the factual content of the subject, and more to the scientific method with its wholesome skepticism and rigorous scrutiny, they might bestow upon the student an intellectual tool as useful in the clinic as it is in the laboratory. Yet the clinical teacher who respects the scientific method and should like to see its influence impinge more forcefully upon clinical dentistry seldom finds in his students an inclination to doubt. A strong infusion of doubt would not only serve to make the facts which are retained stick tighter, but it would also carry over into the years of practice. Then it would rise up to challenge the coteries built around a few strong personalities, and perhaps even lead to economies in that the dentist might not believe everything the detail men say about their products.

The suggestion that we are sometimes too obsessed with facts and techniques, and negligent of the implications of the profession, may strike you as vague. Cast as it is as thinly veiled advice, it may seem inapplicable to a profession governed by the explicit language of a Dental Practice Act, and for educators who must prepare candidates for the State Board of Dental Examiners. Some assurances should be given that

a professional school can concentrate on implications, and still better, that suitable methods are available to dental teachers.

To say that one must have competence in dentistry, but along with it understand the implications is another way of saying that dentistry is not merely making facts and skills perform, but it is as well an intellectual pursuit. Because this is so, we might profitably examine a professional curriculum wherein success is measured by the degree to which the student's intellect is trained—not the medical school, with which we have been confronted to a point of diminishing returns—but the law school. There is a basic difference between the distinguished law schools of this country and those which just turn out attorneys. The run-of-the-mine schools drill their students in the civil code of the state, and honesty compels me to report that if the number of successful bar examinations is to be the criterion, they do well enough. In the highly respected schools, however, instead of all this memorizing the students gain a familiarity with the law library and gradually come to know not so much precisely what is the law, but how it came into being. It is desirable that a lawyer have a feeling for jurisprudence, for in a way the practice of law consists of making prophecies. Whenever a will is drawn, a client is advised, or a case is taken to court, the lawyer is implicitly predicting the outcome of the matter in the event of litigation.

Yet dentistry consists also of prophecies. The orthodontist selects a plan of treatment, and thereby predicts that the best in the way of functional efficiency, longevity of tissues and stability will ensue for the patient. In restorative dentistry one should look into the future oral health of the patient and select his procedures with that in mind. And because tissues are as unpredictable as juries, one cannot follow rules by rote; you must instead utilize a system of intellectual trial-and-error which leads to sound prophecies.

The mechanics of instruction in the good law schools involve the "case method," whereby case after case is reviewed by the students until a working concept has grown through a process of accretion. Rather than using the "Now Hear This" method of teaching, Harvard's School of Business Administration has also employed, with conspicuous success, the case method.

The applicability of the case method to dental teaching must be obvious. The student clinic goes only a part of the way, since the available cases may be far from ideal, they seldom present themselves in the most desirable sequence, and in any event, they are not shared with the entire class. Seminars, of course, go farther. The best use of the case

method I have seen has been in orthodontic study clubs, rather than in schools, and it is stimulating to see men devoid of teaching experience demonstrate, by means of discrimination exercised in case selection, and skill shown in their presentation, a real gift for teaching.

Even this cursory discussion of the implications must consider how the professional man conducts himself in the community, how he utilizes this education that has been bestowed upon him at considerably more cost to society than to himself, and the extent to which he will, of his own volition, make that education a continuing process. The sense of independence sought by so many who enter a profession is a privilege which carries attendant responsibilities. If he chooses, he can, by virtue of the public's ignorance and his own training, use that training to serve selfish ends, although ordinary considerations of sportsmanship should make that unthinkable. It is these considerations of taste, ethics and the obligation for continued growth which I had in mind when earlier I entered the demurrer as to what might rightfully be expected of dental education. So long as men spend four years in dental school, but forty practicing dentistry, there will be influences upon them, benign or otherwise, which will dilute our best efforts. We must claim only limited credit for our finest alumni, and be partially relieved of responsibility for the others.

Continuation study in dentistry, with its refresher and postgraduate courses offers the best hope for the dental schools to maintain beneficial contact with the profession. Because education is at its best when related to the previous experience of the learner, points which make no impression on undergraduates will be seized by the alert practitioner. That difference in attitude and receptivity requires that a different approach to teaching for postgraduates be employed than for undergraduates, if one is to make best use of the experience of the older man. If we could somehow be assured that all dentists would take advantage of continuation study opportunities, even the most timid of us would advocate changes in undergraduate teaching, changes which the most adventuresome would now call foolhardy.

You are not being exhorted to tear up your lecture notes and swing over entirely to the case method by means of kodachrome slides, or to abandon lectures altogether in favor of snug little discussion groups for jolly fine talk. I do not believe that colleges of dentistry should be remade into schools of law. I have no pet program of curricular reform, and look with suspicion at least upon the sweeping claims of those who do. This generation of dental students certainly has the intellectual

capacity for the change in attitude I hope some day to see, but the dental teachers will have to point the way. Many years ago Frank Casto said all this at least as well as I have said it, and a good bit more briefly. Frank had had no more formal instruction in the methods of teaching than have had most of us, but he knew dentistry and he appreciated keenly its implications. His teaching credo was put this way: "I try to teach so that the students will call me Dr. Casto while they are in school, and Frank after they get out." In this brief sentence he has caught the mutual respect that grows between the good teacher and the apt pupil, and he holds forth the promise of intellectual and professional companionship which can last, like a good marriage, "So long as you both shall live."

WAYLAND DELANO WILCOX—1875-1954

The death of Wayland Delano Wilcox on March 9th of a heart attack at the age of 78 has been regretfully announced.

Mr. Wilcox was born in 1875 in Coventry, R. I. He was educated at Alfred University, Alfred, N. Y., Lewis Institute, Chicago, and at the University of Chicago, from which he was granted degrees of B.D., Ph.B. and Ph.D.

He entered the employment of Lea & Febiger in September 1915 and has served continuously as Editor and Manager of the College Department since that time.

During the many years of Mr. Wilcox's association with medical and scientific publishing, he made countless friends among teachers and authors in these fields, and among his colleagues in other firms. He has often been referred to as the "dean of medical publishing," a title which he richly deserved.

Surviving him are his wife, Mrs. Agnes B. Wilcox, and a son, J. Lyon.

COMMENTS AND SUGGESTIONS ON DENTAL JOURNALISM AND EDITORIAL PRACTICES

AUSTIN H. KUTSCHER, D.D.S.*

In the editing and publication of dental periodicals, as might be expected, there remains much room for improvement. The functions and presentations of dental journals should be subjected to careful scrutiny at regular intervals. Some concrete observations on the format and operation of dental journals as seen by an editor-researcher are outlined below.

There are inordinately long delays in the reviewing of manuscripts submitted to many journals. Members of editorial boards in positions of authority and consultants on manuscripts should promptly discharge their duty if they accept the responsibility of evaluating articles. A delay in publication—amounting to as much as one year following acceptance of the manuscript for publication (longer if this period is counted as beginning with the submission of the manuscript for publication) is highly undesirable. Although this delay period must perhaps be temporarily accepted, the review of manuscripts submitted for publication can, at least, be prompt. The elapsed time prior to acceptance or rejection in no case should exceed three weeks. A reasonable concept, at least for our relatively solvent or affluent publications, should be "if it is worth publishing, print it promptly."

Many editors, their associates, or their assistants do not bother to *personally* acknowledge receipt of manuscripts (by typewritten and signed letter as opposed to a mimeographed letter or printed form postcard) and in some cases make no acknowledgment at all. Often editors do not even *personally* advise the author of the acceptance of his manuscript. Personal acknowledgment of receipt of manuscripts by a proper authority in the journal office (the letter may be substantially the same in all cases) is a courtesy which should be accorded to the investigator assuring him that the manuscript is in the desired hands. Were all editors more aware of the care incident to the preparation of most reports, there would be more consideration shown for the personal feelings of the researcher. If at the time of receipt of a manuscript the editorial office is aware of the unavoidable probability or possibility of a prolonged delay in the reviewing of a manuscript, the writer should be apprised of this promptly and in some instances offered the privilege of requesting the return of his manuscript so he might submit it to

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another journal for more prompt consideration. If an unexpected and unavoidably long delay intervenes in the review of the manuscript, this occurrence with suitable assurances should be communicated to the author through the journal office to break up any protracted period of delay. Although the burden of the editorial office of dental journals is heavy, and the cost not inconsiderable, such personal letters should be routine office procedure—a situation not true of many journals today.

Upon receipt of manuscripts, a very neat and carefully prepared original copy should routinely be handled with the utmost care and should in no way be marked or marred or stamped. Great time, effort and frequently cost go into the preparation of some manuscripts, especially those with photographs, charts, graphs, tables and figures. If it is the journal's desire or policy to make notations upon the manuscript at the time of its submission or subsequently (as number, date of receipt, comments, etc.), the investigator should be requested in the journal's printed instructions for the preparation of manuscripts to submit a carbon copy (which in no event would be returned) which might be marked up by the journal at its discretion prior to acceptance or rejection of the manuscript. Also, if the manuscript is to be reviewed by more than one individual, the carbon copy can be made use of in this connection also, thereby considerably reducing the time consumed in reviewing the article. Manuscripts which one journal feels it can not use may be eminently suited for another publication. If, however, the original manuscript is returned in an unsightly condition or with evidences of previous submission for publication, the costly and time consuming job of retyping and reassembling a new manuscript original is necessary before the manuscript can again be submitted for publication elsewhere.

In instances of rejection, an editor should be kind enough to routinely suggest on the basis of his experience other journals to which he feels the article might be more suited for publication—if he feels the manuscript worthy of publication. If the rejection is based upon scientific grounds, the author should certainly be advised of the specific causes for rejection.

In rewording to improve the style of a manuscript, key words, sentences and thoughts should in no way be altered by editors. The use of the term "et al." is highly undesirable in the body of manuscripts, in the reference section or elsewhere in journals. It should be editorial policy not to use this abbreviation and to require the substitution of the names of all collaborating authors if manuscripts are submitted containing "et als." If the name of one author of a team is to appear on the front page of a journal, the names of all the authors should appear

thereon also. Each author's name should appear in all indexes and on the monthly table of contents.

Journals should make an effort to publish the volume number, issue number, month and pages included on the front cover *and* binding of each issue of the journal. Such placement of this information facilitates the finding of a journal in the stacks, the handling and filing of journals in a library, and the jotting down of a reference for an article—since the table of contents page does not have to be sought out to obtain the needed information.

There is need for a dental manuscript service, staffed by selected consultants, to which "embryo" writers might submit their manuscripts for constructive and helpful editorial criticism prior to the actual submission of the manuscripts to a journal for publication. This service might be set up as a country-wide function of the American Association of Dental Editors or regionally in dental schools or other educational institutions.

Journals should require the senior author to publish an adequate and complete address at the conclusion of the manuscript, preferably in the same place in each article and in each journal. This would be a great aid to persons desirous of obtaining reprints or of entering into correspondence with the author. All too frequently the author's address is too incomplete for delivery according to the postal authorities.

It would be desirable to decide uniformly which academic and professional degrees should properly be listed after an author's name and also to have uniform positioning and copy content of those footnotes having reference to faculty, institutional and hospital staff affiliations.

Instructions to the author (investigator) for the preparation of manuscripts should be placed logically, conveniently, conspicuously and in the same place in all journals (perhaps on the page after the content page; on the editorial page; on the page including the editorial staff; or at least indexed on the table of contents page). There should be no need (even in the interests of increased advertising revenue) for a search through reams of pages to ascertain such information or for that matter to find the table of contents! Nor should the table of contents page be hard to find, broken up and distributed throughout the journal for reasons of revenue.

Although the number of authors to be included on each paper should naturally include only those investigators actually taking active part in the study, no attempt should be made to limit the number of such authors solely on the basis of indexing and library problems or printing

costs or arbitrary preconceptions. Only by full and proper recognition of all investigators' contributions by means of coauthorship can adequate incentive, collaboration, coordination and cooperation be obtained and maintained in research studies. The publication of suitable acknowledgment (to appear at the conclusion of an article) of contributions made to an article by additional individuals including interested and helpful members of the laboratory and secretarial staff should be encouraged rather than discouraged for similar, equally equitable and important reasons.

Journals should accept responsibility for referring to authors requests for their reprints from individuals who do not have access to the particular journal from which the reprint is desired, and from which issue the author's address might be obtained (provided postage accompanies the request) since such addresses are, of course, readily available in the journal's own office.

Many journals, including ours, have found the publication of abstracts not so much a financial burden as a time-consuming editorial burden. The difficulty of obtaining abstracts suitable for publication has remained great for all journals and insurmountable for some. The New York State Dental Journal has frequently turned to the author to prepare an abstract for us of his own article, believing that by this method we obtained the most faithful miniature or brief replica of the original manuscript, with emphasis on those portions of the article which the author believes most important.

The New York State Dental Journal, with this thought in mind, is taking the lead in requesting its authors to abstract their own articles and will henceforth make such abstracts available to any reputable dental or medical publication upon written request. Authors are requested to furnish abstracts, each of which is a formal informative summary of the entire content of the article, approximately 250-300 words in length; telegraphic style avoided; extent and source of the material, observation and results summarized; tables and graphs not included; new technics, apparatus or adaptations summarized and their intended use and principles of operation stated. This plan might well be taken up by other dental journals and thus expanded to the mutual advantage of all participating journals.

It would be well if dental journals as a group adopted the principles of medical writing as described by Fishbein in his book *"Medical Writing,"* especially with regard to uniform bibliography listings.

The artificial divorce of the dental and medical literature (both as

to authors and content) is to be determinedly discouraged as being deleterious to both. Routine publication, in dental journals, of full length or abbreviated abstracts of inter-related pertinent material appearing in the medical literature can only be regarded as a healthy step forward which would simultaneously stimulate a similar "about face" in the attitude of medical periodicals. One of the most effective means of dramatizing the importance of the inter-relationship and impact of the two professions on each other is through such a medium of exchange.

One cannot help but to speculate upon and be intrigued by the possible effect on the quantity and quality of the dental and medical literature were articles to be published without the names of authors and institutions. If this is not practicable, in terms of our present journalistic and professional frame of mind, then perhaps it would still be highly desirable to minimize the importance of authorship by eliminating all such practices as printing authors' names on covers, by eliminating authors' names from tables of content pages, and even by including authors' names only as small print footnotes in the article itself. The quality of an article, not its authors or source should, in the final analysis determine acceptability for publication and desirability for reading.

Above all, at no time should the importance of the dental journal as one of the most important instruments of mass postgraduate education be underestimated or forgotten.

The real use of all knowledge is this: that we should dedicate that reason which was given us by God for the use and advantage of man.

—Bacon

CONFERENCE SESSIONS

IV. CLINIC ADMINISTRATION

WHAT CONSTITUTES A DENTAL STUDENT'S QUALIFICATIONS FOR GRADUATION FROM A CLINICAL STANDPOINT? WHO DECIDES ON HIS GRADUATION?[1]

SUMTER S. ARNIM, B.A., D.D.S., Ph.D.,[2] *Houston*

The purpose of this paper is to discuss qualifications of dental students for graduation. Thoughts expressed are derived from experiences with several clinical systems, discussions with numerous teachers and practitioners, as well as studies with several interested authorities in the field of general education. The excellent results obtained with all systems in common use in the dental schools of North America is recognized. With this fact in mind the question is asked, "Is it possible to make the best better?" Suggestions concerning educational research in the dental clinic are made. Such research could lead to improvement of clinical disciplines for qualifying and evaluating dental students for graduation. An analysis of methods for measuring student progress with special attention to choice of examiners is included.

A pertinent discussion of the dental student's qualifications for graduation can logically begin with a question concerning the objectives of dental education. The need for dental service has arisen through the public need. Too much emphasis cannot be given to the role of the general practitioner in an average practice in our small communities. What types of services best meet his patients' needs?

In the field of operative dentistry the needs are usually met through careful diagnosis followed by planning and treatment. Included in the treatment plan is correct recognition of the importance of supporting tissues of the teeth. Adequate provision for prevention and treatment of gum disease is made prior to or with restorative procedures.

The general practitioner of dentistry finds himself chiefly occupied with excision of extremely hard tooth tissues and restoration of these tissues with suitable materials. In some cases the use of certain technics usually employed in the field of medicine or therapeutics is advisable. Caries prevention and control, correct treatment of hypoplastic defects, management of mottled enamel and dentifrice abrasion are in this group.

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[1]Presented before the Conference Session on Clinic Administration, American Association of Dental Schools Meeting, Philadelphia, March, 1953.

[2]Professor of Pathology, University of Texas, Dental Branch.

What operations consume the great majority of time? They are those designed for treatment of carious lesions, namely: the preparation and restoration of teeth with amalgam, silicate, cast gold (inlays and crowns), porcelain, acrylic and on rare occasions gold foil. All dental students should be well qualified in a simple, standardized technic for restoration of teeth with these various materials. The student also should develop the highest degree of clinical judgment concerning their selection and appropriate use. Attainment by the student of these skills and judgment is a direct answer to the patient's problem and also provides the best solution to the question, "What should constitute a dental student's qualification for graduation?"

This clear objective should not be clouded by artificial requirements patterned to individual teacher's research interests nor should it be interfered with by obsolete examining board exercises. Some things can be judiciously postponed for graduate and postgraduate study or development by the student on his own time in his own office. It is no longer possible to teach in two years all that is known of clinical dentistry. It is not to the advantage of profession or public to continue to try to do so.

The "mouth doctor" in the small community who treats his sick patients for their dental diseases must be a highly qualified, skillful dental surgeon. His technical, scientific and spiritual attainments should prepare him for accepting, as a well informed citizen and competent dentist, his whole community responsibility. The qualities of honesty and integrity are necessary attributes of the whole professional man. His patients will value these qualities highly, even above his technical attainments, and rightly so. In addition the dental student should acquire the technic of understanding, an ability to listen and a sincere and earnest desire to be of service to others. An appreciation of the need for religion with the quality of wholesomeness will further provide him with those qualifications that will best fit him for his future life of service in the community.

What are the clinical disciplines that develop best the qualifications suggested for our prospective graduate? It is generally conceded that example through demonstration is the best of all teaching technics. When a teacher with desirable qualifications enlists the aid of a student to assist him in operating on a patient, we have a condition most favorable to the learning process. This method has been used in the surgeries of our medical schools for many years with unimpeachable results. It was also used to good advantage in dental schools prior to and just following the turn of the century. There are few of the great teachers, teachers

who taught by precept, left in the modern school of today. It is suggested that this trend be reversed by using more outstanding general practitioners and specialists on a part time basis for demonstration teaching at the doctor-student level. The practitioner under this plan would show one or two students (at the most) just how he does the job in his own office. Such demonstrations would contribute much to the development of professional values and would motivate the student to acquire a high degree of surgical skill through future clinical practice.

The clinical pathologic conference is an exceptionally useful tool for building the qualification of clinical judgment. It has been used little in the field of operative dentistry in the past. With the advent of new knowledge concerning pulp reaction to surgical trauma during preparation of teeth it is finding its place in many schools. Much can be learned by examination of teeth following extraction. This is best done following the technics used at autopsies in the field of general medicine. Careful analysis of the patient's history, gross and microscopic examination and recordation of changes observed in the extracted tooth, interpretation of the findings; all presented by the student to an interested group of fellow students leads to development of keen clinical judgment based on a firm foundation of basic sciences correctly correlated with clinical practice. The average patient in the average dental practice is greatly in need of services incorporating the best in clinical judgment.

A further and no less important qualification for graduation is a desire for continued learning. In order that such a desire become a reality it is necessary the student be skilled in technics of self education. How does the practitioner of today place restorations with the new self polymerizing acrylic resins? Was he taught these technics in school? How does he decide whether these restorations are desirable forms of treatment for his patients? The ability to analyze critically offerings in our scientific journals and trade advertisements is not acquired without training and effort. Some schools have courses devoted to dental literature, how to prepare a paper, how to present one and most important of all how to evaluate an offering critically. Student seminars dealing with individual research at the student level, review of recommended literature and presentation of interesting cases, when conducted correctly, do much to acquaint the undergraduate with the tenets and principles of the scientific method. Through these and other methods every modern student should be qualified to continue learning following graduation. Practice with the technics of learning how to learn fulfill this need.

So far little has been said about development of surgical skills for cutting hard tissues of the tooth and for needed manipulation of ma-

terials for restoration of the operated area. This important phase of clinical teaching is aimed to qualify the student in those technical skills essential to the practice of dentistry. This qualification obviously must be of the very best attainable. Dental teachers can be justly proud of results obtained in this area. If some say too much emphasis has been placed on technics and technical proficiency, at a cost of inferior attainment in professional quality, let not this be a justification for lowering the standard. Instead, such criticism may rightly provide the necessary stimulation for development of new teaching methods leading to improvement in both areas. Let us not forget the wise counsel of Thomas Weeks,[3] "All practices . . . that exercise the mind, the eyes, and increase the dexterity of the hand will contribute toward the preparation of a student for dentistry. The ability to understand is also improved by seeing and handling and doing; in fact, systematic training with the hands is not antagonistic to mental growth, but may actually assist it." The dental student who is truly qualified to graduate needs to equal the excellence of his predecessors in technical skills and have as his avowed purpose the desire to set a still higher standard for the future.

In the paragraphs we have postulated a few desirable qualifications for graduation by the dental student. How can student acquisition of these attributes be determined? The time has come for serious studies of ways and means to better the best. The use of the practical examination provides two outstanding services in the role of student evaluation. Students participating in these exercises are working under conditions of stress that simulate conditions found in office practice. Responsibility is where it belongs, with the student operator, not the instructor. Would it be possible to combine the comprehensive examination system and the point system to advantage? This might be accomplished, in the area of operative dentistry, with careful selection and assignment of patients. Each student is provided with a minimum number of patients who require the various operations needed for the better students to attain desired clinical proficiency. Students with less native surgical skill are provided additional patients as indicated. Each patient should receive a complete service. No undue emphasis is placed on the single filling and no credit is given for "a" restoration. The instructor's duties are to be of help, through demonstration and actual assistance. The instructor's primary objectives are to develop further his own abilities in dentistry and dental teaching, to know and work with his students.

[3]Weeks, Thomas E.: Manual of Operative Technics; H. D. Justi and Son, Chicago, 1894, p. 1.

Patient examination with routine x-rays, follow-up and controlled recall provide a safeguard and detect undesirable clinical practices.

The reason it is suggested that the selection of patients should provide the student with the minimum number of operations thought necessary to develop desired abilities lies in past experience with these methods. Students learn better and faster when responsibility for learning is delegated to the learner, not the teacher. A second reason is found in the continuing growth of dental knowledge. It is now impossible to perform all known types of clinical operations in the time available; some have to be omitted from the formal teaching schedule. All graduates of medical school do not set 10 broken legs in order to graduate, many set none at all. It is not argued that this is a desirable state of affairs. The point is made that a responsible individual of professional caliber should be able to learn without the constant attention or presence of a teacher. Evaluation of student qualification should be directed to measure this ability to learn in addition to ability to memorize facts and perform certain technical procedures.

When the student, with the advice of his instructors, feels confident he has developed the qualifications for graduation he can apply for permission to take the qualifying comprehensive examinations. These should be extensive and revealing. They should cover the application of preclinical sciences to the practice of dentistry and especially those phases of practice that meet the needs of the majority of patients who visit the average dental office in the average community.

Any system employed to measure student progress must, above all, be fair to the student. When the comprehensive examination system is used it is suggested a series of progress achievement exercises (students nickname these "county boards") be given on specific dates to provide the student with knowledge of his progress and acquaint him with the methodology of this type of measurement. Grades given on progress achievement exercises are not used as criteria of student standing. The objective is to acquire necessary qualifications for advancement, from year to year, or for graduation. Consequently, students failing to make satisfactory records on a progress achievement exercise are given opportunity to remeasure themselves following additional preparation. The additional preparation may be more or less extensive as the consulting instructors see fit. Under no circumstances should grades be averaged at the end of the quarter or year. This would destroy the objective of the system, namely to allow the student to measure his own deficiencies and give him assistance, advice and help in remedying same. When he acquires the desired skills and professional qualities he should be

given full credit for so doing, not a B— because he failed to define bevel correctly on a written quiz October 1, 1952.

Who decides when a student attains the necessary qualification for graduation? As a general rule these decisions are made by the student's teacher or a committee composed of several members of the faculty. Can we find suggestions leading to improvement of what we know to be a good system? It is difficult to improve upon student evaluation by a group of his immediate teachers, teachers who have worked with and for him from day to day and who know him well. Such teachers have the necessary knowledge to estimate the intangibles as well as the tangibles. They know full well his technical abilities and they can make a fair guess as to his overall fitness for the health profession. They are able to devise adequate comprehensive examinations and administer same when this is deemed advisable. Of all systems of measurement in common use in our dental schools today, this one is best, evaluation by that group of teachers most closely associated with the student. All concerned, not a special committee, provide fairest judgments.

There are several disadvantages in evaluations of this kind. Students are often typed by their teachers, someone must be placed at the bottom of the class. Those at the bottom of the class are dumb, consequently they should fail. Could it be that some at the bottom of the class might have been at the top had they been fortunate enough to enter with a different group?

It is common educational practice, and thought to be wise by some, for a university to employ an examining board above and apart from the regular full time teachers. In dental schools such a board might be appointed from those outstanding local clinicians who assist with the clinical demonstrations, it could be composed of a separate group of equally eminent members of the profession with no other teaching obligations than those of comprehensive examination. Such a board could conceivably contain representatives of the state and national bodies. Should the comprehensive examinations meet the approval of the state or national representatives, qualified students could be recommended for licensure without more ado. It is suggested that experimentation along these lines would yield interesting and perhaps far reaching results in dental education.

Summary and Conclusions

This paper contains a short discussion of the basis for determining a dental student's qualifications for graduation from the clinical standpoint with special attention to operative dentistry. The basis for the

suggested qualifications is found in patient need for dental services of this type. Clinical disciplines for obtaining and evaluating the desired qualifications are described and analyzed with the thought in mind of searching out new ways to improve the present excellent system.

QUALIFICATION FOR GRADUATION FROM A CLINICAL STANDPOINT[1]

GEORGE S. EASTON, D.D.S., M.S.,[2] *Iowa City*

A thoughtful consideration of the subject of this discussion leads one to this conclusion: a dental student's qualifications for graduation ought to approximate rather closely the objectives of education in dentistry.

It once was assumed that the dental course should lead primarily to a high degree of competency in reparative and restorative treatment. The dental schools, like the better vocational schools, sought excellence only in technical procedures. If this assumption were still acceptable, the problem of clinical qualifications for graduation would be greatly simplified.

A concept of the objectives of dental education, broader in scope than previous concepts, was formulated by Gies[3] in 1926. This concept, in an elaborated form, was adopted by the American Association of Dental Schools in 1934. The objectives emphasize the relationship between oral and systemic health, the need for attention to the biologic aspect of treatment, the need for effective cooperation with persons engaged in allied fields of service, and the stimulation of a desire for continuing professional study after graduation. These objectives imply that there should be attainment of something more than skill and a knowledge of facts.

A candidate for graduation in dentistry should have learned a number of scientific facts. But he should also have learned how to deal with these facts with intelligence and with discrimination. Certainly he should have achieved a degree of manipulative skill. But he should also have gained the ability to correlate this skill with the biologic principles on which dentistry is based. Cleanliness and orderliness of person, of procedures, and of equipment should have been mastered. He should have learned that dealings with patients should be on the highest level,

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[1]Presented before the Conference Session on Clinic Administration, American Association of Dental Schools Meeting, Philadelphia, March, 1953.

[2]Director, Dental Infirmary, College of Dentistry, State University of Iowa.

[3]Gies, William J.: "Dental Education in the United States and Canada," *Carnegie Foundation for the Advancement of Teaching, Bull. No. 19*, 23-24.

based only on truth and fact. Also he should have attained a real desire to continue to increase his professional knowledge and skill.

Admittedly, some of these factors are not usually included in our thinking about qualifications from a clinical standpoint. To many of us, the term *clinical requirement*, or *qualifications from a clinical standpoint*, means certain specific accomplishments in clinical practice. Usually it refers to specific treatments, such as a stated number of operative restorations, crowns or dentures. These are measurable accomplishments; they can be graded and counted by points or as units. Perhaps that is as it should be. But where, better than in the clinic, can the student demonstrate his degree of attainment of other factors which also constitute the objectives of dental education and which should, therefore, be considered as qualifications for graduation?

Surely the clinic is where he can best demonstrate his ability to apply knowledge gained in the basic sciences to oral diagnosis and treatment. Here he can best put to practical demonstration his knowledge of dental ethics, his desire and ability to be professionally honest with patients. Where, other than in the clinic, can he so effectively demonstrate those qualities of character so essential to professional standing? These are, indeed, intangible items. It would be difficult to measure them in points or units. But they are important, and they should be considered as important qualifications from a clinical standpoint.

Through the years the problem of clinical requirements for graduation has received considerable attention. Some have urged strongly in favor of quantitative requirements; others have favored only a quality requirement. Green,[4] for example, emphasized the value of quantitative requirements by saying that, "men with lesser ability are (thereby) brought to higher thresholds by means of repetition of behavior patterns of training which are corrective. Thus a higher threshold or plateau is obtained by striving for idealism and perfection." But Craig,[5] in a report of quantitative clinical achievement, presented evidence of a "greater student average achievement" in operative dentistry, prosthetics and crown and bridge "within those schools not having a quantitative requirement than in those having such a requirement."

The clinical staff at the University of Iowa believes that there is a place for quantitative requirements as an aid in determining qualifications for graduation from a clinical standpoint. We do not feel so

[4]Green, R. O.: Discussion of paper on "What Constitutes an Adequate Requirement in Clinical Operative Dentistry," J. *Dent. Educ.*, 11, 83; Oct., 1946.

[5]Craig, Charles W.: "Student Average Quantitative Clinical Achievement," J. *Dent. Educ.*, 16, 7; Jan., 1952.

confident about the mechanics of measuring such requirements. We used a point system and concluded that, as we used it, it has little to offer in its favor. We now use a unit system. It is more satisfying but it is not the perfect solution.

Whatever may be the method of weighting clinical requirements, their effective use must always recognize the importance of individual differences in aptitude and in adaptability. They must never constitute a penalty for those with inherent ability.

The value of a quantitative requirement lies in the fact that it serves as a stimulus to repetition while, at the same time, it constitutes a simple and expedient means of attaining a properly varied experience in clinical practice. Repetition is recognized as a cardinal principle of the learning process. As Wylie[6] puts it, "to deny this is to deny the value of the internship, and the value of the clinic itself." But it is valuable only to the extent that wrong procedures are not repeated, that repetition is used to approach perfection. Thus we must conclude that, to be valuable, a quantitative requirement must be used in conjunction with a quality requirement.

All clinical departments at the State University of Iowa have a quantitative requirement for graduation, assuming the term *quantitative requirement* to include both units of time and units of treatment. Service in the departments of oral surgery and pedodontics is on a time basis—the so-called block system of assignment. This is also true in orthodontics but with a slight variation.

To be eligible for graduation a student must have spent a total of thirty days in the children's clinic, fifteen in each of the two clinical years. Under our plan of clinic operation this represents approximately 118 working hours. There is no specific case or unit of treatment requirement, but the appointment system functions in such a manner that each student is kept busy throughout the entire period of his assignment. The assignment of patients is closely supervised so that students may receive experience in a multitude of problems in clinical dentistry for children. Their experience includes examination and diagnosis, prophylactic and gingival therapy, development of nutritional histories, complete and bite-wing surveys, pulp therapy, anesthesia and exodontia, construction of removable and fixed space retainers, placement of restorations of amalgam, cements and, to a limited extent, of gold.

The department of orthodontics requires each junior and senior student

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[6]Wylie, W. L.: "The Evaluation of the Student's Efforts in Clinical Dentistry," *J. Dent. Educ.*, 6, 115; Dec., 1941.

to spend three three-hour periods per semester in the orthodontia clinic. During these periods the student receives brief orientative instruction in the use and interpretation of cephalometric roentgenograms. As an assistant to a graduate student he learns, by observation, the rudiments of diagnosis, treatment planning and appliance construction. There are no treatment requirements. But the student may accept for treatment a simple case such as one requiring a bite plane to obtain an increase in vertical dimension, or one requiring the repositioning of a tooth prior to construction of a bridge.

The clinical requirement in oral surgery is also on a time basis alone. Seniors and juniors are assigned to the extraction clinic in blocks of four each for two consecutive weeks per semester. Juniors serve as assistants to the seniors. The extraction clinic operates on an appointment system whereby the patient is appointed to a specific chair at a designated time. This enables students to be kept equally busy and permits an equitable apportionment of the daily treatment load. In addition to this assignment, each senior has a one-week assignment to the Iowa City Veterans Hospital and University Hospital dental services. Here, in addition to further training in exodontia, he assists in oral surgery problems, learns ward and operating room routine, attends a clinical pathology conference and hears the deliberations of a tumor board.

The departments of operative dentistry, crown and bridge, prosthodontia and periodontia make use of quantitative requirements based on operational units or units of treatment. Prosthodontia, for example, considers an upper and lower denture, or a single partial denture, as a unit. The requirement includes six full upper and lower dentures together with a specified number of partial dentures, single dentures, denture rebases and repairs.

In operative dentistry a restoration constitutes a unit. The requirement totals 108 units. Included are 14 foil restorations, 21 inlays, 36 amalgams, 16 acrylics and silicates plus 20 elective units.

In crown and bridge every abutment, pontic or single crown is classed as a unit. The requirement includes 15 bridge units, 6 crowns and some miscellaneous units including repairs and baked porcelain tips.

In periodontia a unit is an entire case. Twenty-eight are required, including 15 prophylaxes not performed in conjunction with other types of periodontal treatment.

It is appropriate now to admit to our misuse of the term *clinical requirements*. Since graduation is not necessarily predicted upon completion of every stated unit of treatment, our usage of the term is not

quite correct. To avoid misunderstanding in our clinic, the use and relative importance of our so-called *requirements* is explained to students entering the clinic.

The total requirement for each of the departments using unit requirements is divided into specific requirements for juniors and less specific requirements for seniors.

Junior requirements are specific to the extent that each student must satisfactorily complete the stated number of operations. They are minimal to the extent that their existence can not create a problem in the student's mind. They afford the student no valid reason for wanting to substitute quantity for quality. The adept and progressive students meet them easily and proceed with assignments beyond those required in the junior year. Less adept students, those who progress more slowly, must extend themselves to meet all requirements.

Our senior year is looked upon as one in which the student will, by repetition, simultaneously improve his skill and speed, and learn to handle the more difficult problems in the various phases of practice. He is encouraged to think more in terms of case analysis and oral rehabilitation. For him requirements still exist, but their importance is greatly de-emphasized. During this year they serve primarily as a classification guide, as a means of emphasizing the need for equalized diversity.

Each departmental requirement includes a number of optional units. These may serve one or both of two purposes. The instructor may use them to direct a student to accomplish additional treatment in an area of weakness. If, for example, a student has a weakness in amalgam restorations, his instructor may direct that a number of optional units in operative dentistry be used for further experience in that phase of practice. The better student may use the optional units in an area of his choosing. He may, for example, elect to experiment with new technics, or to try a material not in common use in our clinic.

Clinical departments report to the Director of Clinics the students' progress toward graduation qualifications. The progress of junior students toward fulfillment of the clinical requirements is recorded on a chart. On this chart, after each student's name, is a square for each required operation. When a department reports that an operation has been satisfactorily completed, the appropriate square is checked. A glance at the chart will indicate what progress student John Doe is making, what progress the class is making and where Doe stands with respect to the class average.

When the chart indicates that a student is falling behind in but one department, that department takes the initiative in discussing the problem

with the student. When more than one department is involved the problem is handled by the director. He consults with the student, attempts to analyze the problem and makes a recommendation for the improvement of his status.

Senior student problems are handled in the same way but a senior's progress is not charted. It is expected that the senior student will have attained sufficient maturity to look after his own problems, and to keep his status clear at all times. He may be warned but he is not prodded.

Student standings are critically reviewed with respect to both quantity and quality at the end of the first semester of the senior year. Those students who appear to be in a precarious position are given appropriate warning. Their weaknesses are explained and they are advised where to expend maximum effort.

As the end of the year approaches departments are asked to make a commitment regarding each student's qualification for graduation. They are not asked for an accounting of his status with respect to our numerical requirements. They are asked only to decide *yes* or *no* on the question: "Is this student qualified to engage in the practice of this phase of dentistry?" When departments do not agree, the matter may be reviewed by the Dean and his Administrative Committee. Usually, however, the decision of a department is final. When all departments concur in the belief that the student is qualified to engage in practice, the faculty is notified and he is officially recommended for graduation.

It is desirable to emphasize the point that unit requirements are by no means the sole criteria for graduation. We do not consider them as such, nor do we use them for that purpose. A student who has completed all unit requirements may or may not be considered qualified. Quality of workmanship, judgment, progressiveness, as well as those less tangible attributes previously mentioned, are given due consideration in our attempt to measure a student's status and to determine his qualification for graduation.

It should be remembered that a candidate for graduation is on the threshold of practice in a recognized and respected health service. He is very close to assuming full professional responsibility. The degree he is about to receive will imply to the public his ability to practice dentistry in the full meaning of the term. It is our responsibility to see that he is so qualified; not as a specialist with much knowledge and experience in a few phases of practice, but as a safe beginner with sufficient skill and knowledge in all phases to render satisfactory dental service to his fellowmen; not as a man of maturity, skilled in the conduct

of practice, but as a newcomer to professional ranks who is demonstrably imbued with a desire to conduct an ethical and professionally progressive practice.

WHAT CONSTITUTES A DENTAL STUDENT'S QUALIFICATION FOR GRADUATION FROM A CLINICAL STANDPOINT AND WHO DECIDES ON HIS GRADUATION?[1]

CHARLES B. MURTO, D.D.S.,[2] *Washington, D. C.*

It is the opinion of the various professors and instructors at Georgetown University that the following factors substantially determine a student's qualification for graduation from a clinical standpoint:

1. Neatness: This implies cleanliness and orderliness of person as well as of armamentarium. They feel, as I do, that habitual neatness should have been carried over into dental school from his previous experience or training at the secondary or undergraduate level, or even better, these qualities should have been taught in the home, prior to any formal schooling. I feel that one of the main reasons for success in dental practice is a clean, sanitary office with a clean efficient dentist and assisting personnel.

2. Ability: By this is meant the skill with which the student accomplishes his tasks and assignments, and the quality obtained as a final result, remembering that technics are a means to the end but not the end itself. As former Dean Appleton[3] has said, "Failure as a dentist would be almost certain for anyone who did not have the capacity to develop a relatively high degree of skill in doing nice work with his hands or who did not enjoy the doing and the products of such work." Many clinical skills may certainly be acquired by purely repetitive learning, but the learner must be first acquainted with basic information upon which, in an orderly progression of steps, a total clinical concept may be built.

3. Knowledge: The information which the student has received from the various courses of instruction and his correlation and application of this knowledge to each specific patient. He should have a high degree of familiarity with the structure and function of the region of the body for which he is specifically responsible. The student should have knowl-

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[1]Presented before the Conference Session on Clinic Administration, American Association of Dental Schools Meeting, Philadelphia, March, 1953.

[2]Professor of Crown and Bridge Prosthesis, Director of the Department and Director of Clinics, Georgetown University, School of Dentistry.

[3]Appleton, J. L. T.: "Goals in Undergraduate Dental Education," *J. Amer. Coll. Dent.*, 17, 438; Dec., 1950.

edge of the scientific methods and he should be able to think. He should know what to do and when to do it for it would be dangerous to graduate an individual, with hundreds of dental patients at his mercy in his dental practice, who might have mastery of technic without a knowledge of when, where or why to use it.

4. Attitude: This includes his professional bearing, his relationship as a professional man to his patient, his reaction to correction or criticism, his courtesy and kindness to patients, fellow students, and his teachers. He should be encouraged in the development of the professional attitude with the constant reminder of the golden rule, "Do unto others as you would have them do unto you."

5. Progress: There should be observed a continuous and continued improvement in ability during the student's years of clinical practice. He should have a scientifically critical attitude which may be relied upon for a sound appraisal of present and future technics. The student must be constantly aware that the mere possession of a dental degree does not automatically terminate his development as a dentist, but constant application and attention to continued improvement in his chosen field should be the ambition and desire of all dental graduates. As graduation approaches a student should acquire an increasing responsibility for his decision and technics.

How are these factors implemented in the specific evaluation of each student?

Georgetown operates its clinical facilities on the block system. I am not here to discuss the relative merits of the block system versus the patient assignment system, but due to the arrangement of our physical facilities, we feel that the block system affords us the best opportunity to give an even amount of clinical experience to each student. This makes it much easier for the faculty in every department to compare students one with the other, as well as to compare each individual student's ability to the standard requirement necessary for dental practice.

There are nine departments in the dental clinic to which each student is assigned for a definite period during his third and fourth years: (1) oral diagnosis and treatment planning; (2) roentgenology; (3) oral surgery, anesthesia and hospital; (4) orthodontics; (5) pedodontics; (6) periodontics and endodontics; (7) operative dentistry; (8) crown and bridge; and (9) prosthetics.

Each department is an entity in itself and the student, during his assignment there, is observed and graded according to the five basic factors by the teachers in each department. There are certain definite

quality and quantity requirements established for each department, together with regularly scheduled examinations, both clinical and didactic. At certain specified periods in every department, instructors turn in their grades for each student assigned and these grades are averaged at the end of the term.

In crown and bridge, operative dentistry and prosthetic dentistry, clinical and mock state board examinations are held. A fourth year student is required to pass three clinical and three mock state board examinations in operative dentistry and two clinical and two mock state board examinations in both crown and bridge and prosthetic dentistry. The average of the grades in these examinations equals one-third the yearly practical grade in each department while the work accomplished daily in these clinics is averaged and the resulting average equals two-thirds the yearly clinical grade.

In the other departments, with the one exception—orthodontics—the whole clinical grade is computed from the student's performance while in those departments without a special clinical examination. In the orthodontics department the fourth year student observes the treatment being carried on by the teachers on cases which are especially selected to give sufficient variety in order to present the various methods of treatment of a variety of orthodontic problems. The senior student prepares models of a specific child patient who has malocclusion and is given an oral examination on this patient and although the student may be led to believe he is being graded, no clinical grade is submitted, because of the fact that the student himself does not accomplish any treatment for the orthodontic patient while an undergraduate. Preventive orthodontics is stressed and the construction of space maintainers is a requirement of the pedodontics department rather than orthodontics.

At this point I would like to quote from our catalogue some of the rules applicable to graduation: "Theoretical and practical work will be graded separately." "Grades are issued on a percentage basis. The minimum passing grade in all subjects is 75%." "The privilege of graduation will be denied to any student who incurs a failure in the practical phase of any fourth year course."

The practical grades from the nine clinical departments are submitted, together with the didactic grades in all subjects, to the dean's office. The Dean in turn submits these grades to the Scholastic Standing Committee for Clinical Studies. This committee is composed of representatives from each clinical department and its duties are:

1. To review the didactic and clinical grades of each third and fourth year student.

2. To discuss any student who has one or more conditioned or failing grades.
3. Upon vote of the committee, to make recommendations to the Executive Faculty.

The recommendations of the committee are taken up at a meeting of the Executive Faculty and reviewed and discussed. This body considers each student who is deficient and final disposition is accomplished by vote of the Executive Faculty, whose decisions are final. The Dean is then authorized to recommend to the President of the university for graduation those who have been approved for graduation by the Executive Faculty.

WHAT CONSTITUTES A DENTAL STUDENT'S QUALIFICATION FOR GRADUATION FROM A CLINICAL STANDPOINT AND WHO DECIDES ON HIS GRADUATION?[1]

HAMILTON B. G. ROBINSON, D.D.S., M.S.,[2] *Columbus*

The procedure for certification of dental seniors for graduation varies from school to school but in most institutions the clinical requirements subject the student to double or triple responsibility. The student must meet requirements that are:

1. *Qualitative*—a certain level of achievement must be attained. This is determined by compiling grades given on individual operations throughout the clinic years, or by a special clinical examination, or both.
2. *Quantitative*—a certain amount of work must be completed. This requirement varies from a definite point or unit total to more elastic evaluation.
3. *Temporal*—a certain amount of time, measured in hours, days, weeks, quarters, or semesters must be spent in clinical work. It is a rare case where a student is excused from his last several weeks or months of clinical experience because he has met quantitative and qualitative requirements.

The type of clinical teaching conducted in an institution will greatly influence the application of the requirements for graduation. Having moved into new clinic quarters in January, 1951, and now having over two years of experience in our clinical method, it seems appropriate to report on the results and their relation to graduation requirements.

Patients admitted to the Ohio State University Dental Clinic are first given a brief screening examination. At this time their general health history is taken and a visual examination of the lips, tongue, palate, cheeks, floor of the mouth, gingiva, occlusion, and teeth is made. The patient's probable needs are recorded in general as operative, pros-

[1]Presented before the Conference Session on Clinic Administration, American Association of Dental Schools Meeting, Philadelphia, March, 1953.

[2]Associate Dean, Ohio State University, College of Dentistry.

thesis, crown and bridge, periodontics, orthodontics, endodontics, etc., and radiographic records are made at the first visit. On a return visit, the students outline the treatment plan which is evaluated by the consultants from the specific divisions concerned. Except for emergency treatments, handled in a specific four-chair clinic, no patients are admitted unless they agree to complete treatment as outlined.

The students carry out their work in individual cubicles under the direction of general clinical instructors. Most of these instructors spend 5 half days teaching in the clinic and the remainder of their time in general private practice. They are encouraged to take postgraduate courses at the school's expense and are given orientation lectures. They bring the experience of general practice to the students who are being trained as general practitioners. The specialists serve as consultants in the diagnosis clinic where treatment plans are being made and as consultants to the students and general clinical instructors.

The senior students are assigned permanent cubicle offices, the juniors using the seniors' cubicles while the seniors are on assigned duty in special clinics, hospitals, etc. A student may be carrying out any procedure in his cubicle (except oral surgery or endodontics) at any time. For example, in five successive cubicles a partial denture, a two-tooth bridge, a gold inlay, a gingivectomy, and an amalgam filling in a child may be in progress. The students are assigned cases for completion, efforts being directed toward inculcating a feeling of responsibility for complete oral care. Each student has a group of patients with diverse needs. He is permitted to cease work on a patient only when it is completed, or if the patient becomes unsatisfactory for clinical teaching, or if a student has legitimate reason for not completing the work because of unusual circumstances. A method has been devised for equitable assignment of patients. It is not within the province of this discussion to describe the method. It is based on complete treatment planning before assignment, and useful records of individual student progress.

During the past year, definite requirements have been eliminated in all clinical branches, except endodontics, pedodontics, and prosthesis. Originally, a requirement was set up for crown and bridge but it soon became evident that all students would exceed it. In the other subjects, the students are expected to complete all patients as assigned.

It has been most encouraging to watch the results of this approach. At the end of the senior year (and including work completed in the

junior year) the present senior class showed the following clinical achievement:

	Operations/man (averages)	Extremes
Gold foil restorations	22	9-37
Gold inlays	32	9-83
Amalgam restorations	45	19-95
Periodontal treatments	14	2-26
Prophylaxes	17	7-30
Endodontics	4	1-4
Class II (children)	13	4-22
Full dentures	3	2-4
Partial dentures	2	1-4
Crown and bridge	@4 bridges	1-7
Surgery	@150 teeth	75-200

Probably the most important factor in the success of a system without definite requirements is to create desire for knowledge and experience in the students. This state of mind is not easy to develop where students have had definite goals and we learned that there was some suspicion about the system. The philosophy of the student, however, is changing and he does things to learn, not just for "credit." Of course, the student still must meet qualitative and quantitative requirements. One difficulty is the desire on the part of dental educators to produce finished dentists at the end of four years of undergraduate dentistry. Clinical dentistry has grown from operative, surgical, and prosthetic phases alone to separate disciplines in diagnosis, pedodontics, periodontics, full dentures, partial dentures, crown and bridge, operative (restorative) dentistry, endodontics, oral medicine, etc. Each discipline has added its requirements for graduation.

We believe that clinical dentistry will serve the public and dentists better by teaching from the standpoint of general clinical dentistry. The hewer of the wood is the clinical instructor who works most intimately with a small group of ten or fifteen students. The men who have devoted their efforts to single phases of dentistry can supervise and conduct the didactic teaching and treatment planning in their areas. They can advise the general clinical teachers and their students. We believe that this teaching philosophy will raise the standard of general clinical dentistry and give the student a feeling of responsibility for rehabilitating and maintaining all the oral structures of his patients.

Dental schools now teach some undergraduate material at postgraduate level. The establishment of postgraduate courses, taught by those who limit their work to individual phases, will soon apprize them of the varia-

tions in levels of teaching. These courses also afford opportunity for continuing education, a distinct need of the dental graduate.

Ultimately, the clinical faculty decides whether or not a student is qualified to graduate, from a clinical standpoint. The decision should be based on whether the student has acquired the experience and skill to operate without supervision.

V. CROWN AND BRIDGE PROSTHESIS

EVALUATION OF THE USE OF VISUAL AIDS IN TEACHING CROWN AND BRIDGE PROSTHESIS[1]

ERNEST B. NUTTALL, D.D.S.,[2] *Baltimore*

It is highly possible that dentistry employed visual aids in teaching long before the dawn of its professional status. With the advent of organized dental education it is certain that models and drawings were used in teaching dental procedures. The reasons for the early use of visual aids were: (1) lack of textbooks, (2) difficulty of describing dental procedures, and (3) the ease of procuring visual aids, e.g., extracted teeth, plaster casts, carved models and drawings.

The very nature of most dental procedures requires every aid possible to enable the student to acquire an accurate lasting perception in a limited amount of time. The value of the microscope in studying tissues and organisms in preclinical sciences compares favorably with the value of x-rays, models, drawings, moulages, slides and motion pictures in technical and clinical teaching.

In the last fifteen years there has been a vast expansion in visual instruction with color slides and motion pictures. (More recently television has been used for special group instruction.) I shall limit my discussion to the use of these devices in the teaching of Crown and Bridge Prosthesis. Basic or fundamental technical teaching in dentistry requires the use of models, drawings and other visual aids. Even though the approach to the problem of teaching is one of applying fundamental principles, it is of great importance that the student be provided a graphic illustration or a model showing the application of these principles. For example, the preparation of mechanical cavity forms in ivorine blocks is a difficult procedure for the student to execute if his instruction has been limited to a description of the use of the principles of parallel

[1]Presented before the Section on Crown and Bridge Prosthesis, American Association of Dental Schools Meeting, Philadelphia, March, 1953.

[2]Professor of Fixed Partial Prosthesis, University of Maryland Dental School.

walls, flat floors, dovetail locks and opposite parallel grooves in developing resistance and retention form of cavity preparation. Models of these prepared forms simplify the procedure and provide a means of quick visual instruction. The value of using vision as a medium to aid instruction in all phases of dentistry is universally recognized.

The manner in which visual aids are prepared and used in teaching is very interesting. However, there are many abuses. It has been observed that too little thought in planning is given to the preparation of slides, motion pictures, drawings and charts. The practice of employing "before" and "after" slides in dental teaching is disappearing in favor of using a series of slides which depict the complete method of procedure. It is the technical detail by which the results of the finished case are attained that is important in teaching. This can be accomplished very well by serialized slides because of the information included in a single slide and the time available for the discussion. Furthermore, slides are the best devices of visual medium to keep a presentation up to date. It is possible to add steps of procedure which were initially overlooked. Nevertheless, with all of the advantages of slides it is impossible to demonstrate the execution of a procedure. We must rely on an accurate picture showing the result or a progressive step in the method employed. The value of the use of slides is enhanced by verbal discussion and blackboard demonstration in the preparation of the student for such a presentation on many phases of crown and bridge prosthesis.

The second abuse of slides is in presenting certain types of information. Not infrequently there will be 25-30 slides of charts used in a 40-minute lecture. It is humanly impossible for the audience to absorb and retain information of value from such a lecture. It may be well to point out that in many instances the information contained in some of the slides is of little practical value.

The third abuse is the use of slides that do not accurately show the specific information. The members of the audience are called upon to exercise a high degree of imagination as the lecturer attempts to describe what should appear on the screen. Obviously, such slides always distract from the subject and should not be included. In addition to employing irrelevant slides occasionally too many are included in a lecture. This is frequently caused by a desire of the speaker to impress the audience with a large number of slides. Also there is a reluctance on the part of some individuals to eliminate material depicting the same information because all of the views photographed turned out well. Such a presentation necessitates flashing a great number of slides on the screen, a procedure which tends to distract the audience. The use of too many slides is

often resorted to in x-ray discussions. It has been observed that 60 x-ray slides have been used in a 40-minute lecture. Too frequently x-ray slides used in conjunction with clinical slides are passed over in a cursory manner. The roentgenographic background which should have been pointed out in detail is dispensed with by calling attention to the x-ray and possibly locating the area. The audience does not have time to study a non-familiar slide to obtain the information vital to the interpretation.

The fourth abuse deals with the lack of preparation on the part of the lecturer. Renting or borrowing slides and motion pictures with which he is not familiar is a factor which contributes greatly to this abuse. However, if the material is carefully selected, previewed and prepared before the presentation, valuable visual aids may be obtained from outside sources.

Sometimes we fail to select the right medium to demonstrate a point or an entire procedure. To avoid this error, long-range planning in developing the subject matter is required. The material should be grouped in such a manner that the least number of slides will be needed. The source of the subject matter is important. The error of copying 30-40 pictures from a current textbook with which to illustrate a lecture is sometimes committed. This practice emphasizes the fact that the students' ability to read and use their textbooks is questionable. Nothing constitutes a more dull and uninteresting lecture than reading back to the students exactly what is in their text. We should endeavor to glean from the textbook the principles and concepts of the particular subject and apply them in preclinical instruction and in the clinical practice of dentistry.

The films obtained from commercial sources have to be carefully selected in order to eliminate those which have only entertainment value. Films produced for advertising purposes frequently obscure the objectives of the presentation. Again, it is possible that the technics shown are not currently taught to the student.

In using motion pictures in teaching crown and bridge prosthesis for the past twelve years, I have made the following observations. First, the short film, 400-800 feet, dealing with limited subject matter, is superior to a long film covering considerable material. Second, the student must be prepared for the viewing of the film. Third, motion pictures should be shown at least three times. The viewings may be designated as: (1) Introduction viewing, (2) Discussion viewing, and (3) Correlation viewing. In the introduction viewing the audience may be distracted by the motion, the color and the adeptness of the operator.

The discussion viewing will afford the opportunity to concentrate on the subject matter. In the final viewing the student is able to correlate the information previously learned with the manual execution of the procedure. It is certain that slides produce a more definite and lasting mental impression than motion pictures. The reason for this is that the limited subject matter and the absence of motion are more conducive to intensive concentration.

The productive use of visual aids in teaching is influenced considerably by the physical facilities of the classroom, scheduled time of lecture, number of continuous lectures and distracting elements. A well-ventilated classroom is a prerequisite in preventing drowsiness. The early morning lecture periods are the most desirable because the student is more alert. The next important factor in a successful presentation is the proper preparation of the audience. Attention should be focused on the subject to be discussed. The showing of the slide or film should be prefaced by a concise description of the objectives of the illustrated discussion.

By using an electric pointer to definitely locate the area under discussion the speaker can maintain a position facing the audience. When a public address system is not available and a wooden pointer is used, the speaker often addresses the screen. An orderly presentation is then of paramount importance in developing the subject. The correct means of making each point as clearly and briefly as possible should be employed. It is well to reserve a few minutes at the termination of the slides or film for discussion and a brief summary.

In using visual aids in the manner described it is necessary for the lecturer to plan the material, select the proper medium to demonstrate the subject matter, preview the slides or film, prepare the audience properly, present the subject in an orderly and deliberate manner, and institute some means of determining how well the subject matter is understood by the listeners.

One should recognize the limitation of visual aids in portraying the particular subject matter. He should select material which will stimulate the student audience and which will not eliminate the necessity for individual thought and self-preparation. The subject matter should be basic in nature rather than impressionistic or glamourized. Whenever possible maintain the necessary degree of distinction between the portrayal of the usual condition and those conditions which are rarely encountered in average circumstances. Restrict the amount of visual aid material to that which will enable you to cover the subject adequately but not superfluously. Avoid films or slides that do not pin-point the subject to be presented; keep "on-target."

Discussion

FRANCIS B. VEDDER, A.B., D.D.S.,[1] *Ann Arbor*

A good many years ago, in most dental society meetings, and even in the meetings of this association, a discussion of a presentation that did not violently disagree with the author and raise an argument that no one could settle, was considered a waste of the audience's time. Fortunately, times have changed; I have gone over Dr. Nuttall's paper with somewhat critical attention, but rather than being in disagreement with him, I am in hearty accord with what he has expressed.

The subject is not an easy one to treat because of the wide variation in teachers, especially in their ability to use the various types of visual aids. For instance, my ability to draw is quite limited. I envy the teacher who can step to the blackboard and draw a clear picture of the point that he wishes to make. I must depend more upon prepared charts, slides and models. The importance of providing graphic illustrations showing the application of fundamental principles has been stressed in the paper. Dental education is unique in that we must teach a large number of mechanical procedures, and correlate these with basic biological principles. It is unnecessary to remind this group how extremely necessary the visual aids are, and how important it is to use them in the most efficient manner.

Dr. Nuttall has outlined very well four common abuses in the use of slides, abuses that undoubtedly we all have been guilty of at one time or another. I heartily agree that showing a large number of slides in a usual class period is more likely to confuse and distract the students, than to clearly illustrate the points the teacher is trying to make. I believe that frequently because of the teacher's familiarity with his own slides, he is prone to assume that others will immediately see the same thing in the slide that he does, with the result that the slide is off the screen before the student comprehends its meaning.

Another point that was brought out, and I believe to be true of almost any visual aid, whether it be slide, chart, model or film, is that it must be accurate in detail. If it is not, it is almost certain to confuse a certain number in the class. Show any average class any one of these visual aids, and even though you emphasize "This is not quite right, it should be——" you will find, after checking some time later by examination or quiz, that a considerable number will retain the image as shown, but will have forgotten completely the remark that it was not accurate.

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My experience with movie films has been limited, and I was especially glad to get Dr. Nuttall's opinion in regard to their use. I have seen many movie films that have been prepared for educational purposes, and I think that in some fields of education they are a splendid medium, but those that we have attempted to use for teaching dental procedures to undergraduates have been a disappointment. I have seen a few that I considered good for postgraduate teaching, but possibly because of his lack of experience, or possibly because of poor preparation for the film, the undergraduate's attention is frequently focused upon inconsequential details rather than upon the fundamentals that the film was prepared to illustrate. I am by no means criticizing the method. I believe the motion picture has great possibilities as a visual aid in dental teaching. I do feel, however, that the preparation of the films that are to be used for undergraduates require more careful planning, especially in regard to content, method of presentation and photography, than most of the films have had.

I was interested in Dr. Nuttall's statement that films should be shown at least three times. I do not dispute this. I only wonder if in the time consumed in showing a film three or four times, it would be more effective in some cases to divide the class in sections and present the material in actual demonstrations.

I want to thank Dr. Nuttall and compliment him on a fine presentation.

VI. DENTAL HEALTH EDUCATION FOR THE DENTAL HYGIENIST *(Conclusion)*

PUBLIC HEALTH TRAINING FOR THE DENTAL HYGIENIST[1]

NEAL W. CHILTON, D.D.S., M.P.H.[2]

(This is the last of a series of three papers presented before this Conference Session, the first two having been published in the January, 1954, issue of the JOURNAL.—*Ed.)*

The topic of my discussion is, "The Public Health Training of the Dental Hygienist." I am of the opinion that it is probably in the realm of public health dentistry that the oral hygienist will best bring to fruition her functions in the over-all health scheme. I say that as a practitioner of dentistry and also as one interested in public health.

When we look, for example, at the observations of a committee of

[1]Presented before the Section on Dental Health Education for the Dental Hygienist, American Association of Dental Schools Meeting, Philadelphia, March, 1953.

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the American Association of Dental Schools meeting in 1951 with the American Association of Dental Hygienists, on the planning of curricula for dental hygiene students, we find that the report of this committee on public health lists considerable material in the training of dental hygienists in public health. I think we can see more and more emphasis is being put on this phase. When we note that the dental hygienist has been expanded from a 1 to a 2-year training program, I think we can realize the expansion has not been solely directed toward additional clinical training for the oral hygienist student. What, then, is the oral hygienist to be trained for in this additional one year? In my opinion, public health is a very, very important phase of dental and medical practice. It is my feeling that the oral hygienist is at times even more important than the dentist in the field of public health dentistry. Why? Because by virtue of their training and the fact that oral hygienists are women, we find they will fit in better into educational and public health schemes throughout the country. While the dentist is trained over a long period of time—rather an expensive training, not only to the dental student, himself, but also to the university, the training of the dental hygienist is not so expensive. This is just from one point of view—that of dollars and cents. It certainly would be a poor approach, I should think, to have a very highly trained person, expensively trained, perform many of the functions in public health which can be accomplished as well, if not better, by ancillary personnel.

The training of the oral hygienist has in the past been essentially of a clinical nature. It has been unfortunate, I think, that in many areas of endeavor after graduation from the school of oral hygiene the oral hygienist has been delegated to a chair assistant or to do office secretarial work. Even in public health programs, the oral hygienist has been relegated to some of these functions to the exclusion of her proper role. It would appear to me that the oral hygienist is the person who can bring the public educational phases of dentistry to their greatest fruition, because hygienists can, and in many places are, being trained partially as teachers. Dentists are not. Because of the nature of the person who goes into oral hygiene training we find she is usually much better equipped than the dentist to perform these functions.

In many states, teachers licenses are necessary for hygienists to work in the public schools. It is for these various reasons I feel the public health training of oral hygiene students is tremendously important.

I mentioned previously the recommendations of the Committee on Public Health, and I would like to go over these, if I may. The aims and objectives of this committee were as follows: The committee agrees

to the following; a knowledge of the theory and practice of preventive dentistry and public health with emphasis on the principles and problems of community health.

The skills and abilities are then listed: The length of the course; the committee agrees that 24 hours shall be recommended as the minimal requirement. If the student is to be prepared for a career in public health education, additional training in health education beyond the two-year course should be provided in accordance with the statement of the definition of the function of dental hygiene education made by the Council on Dental Education.

It is my feeling, too, if a person in the field of dental hygiene wants to proceed further, additional training is necessary, but I feel additional training should be incorporated into the curricula for oral hygiene students to allow them to be a functional teacher of dental health. For those who are going to head up programs of dental education and public programs, additional training can be obtained either at teachers colleges or in the schools of public health which give graduate training in health education. I might add, from the limited experience I have had in this field, it is my opinion that the training at the school of public health in public health education is much more valuable to a person going into public health education than a training one can get at a teachers college.

The other recommendations of the committee I think are fairly straightforward, and I doubt if anybody would have disagreement with the other recommendations. I would like, however, to go over with you two programs of public health education for the oral hygiene student, with which I have had some connection at Temple University and Columbia University.

At the Temple University there is a listing of one course in Public Health. There are, however, other courses in which public health is also taught. The course which is listed in Public Health is a one lecture hour a week devoted to Public Health throughout the two semesters in the second year. Oral Hygiene students meet with the dental students and receive exactly the same lectures and take the same examinations. In the first semester lectures are presented in the basic field of Public Health, including basic philosophies of public health practice, basic principles of environmental sanitation, vital statistics, and communicable disease control.

Communicable disease control can be taught in several ways: one, to list the various diseases, the vectors, and the incubation period, the method of treatment, etc., which is a rather boring situation, because anybody can buy the same booklet that the teacher buys and reads.

It can be bought from the U. S. Public Health Service. I think it more advisable to draw lessons from various outbreaks of communicable disease, particularly in the area in which the school is located, and from these stories, definite instruction can be obtained. It has been my feeling and finding that this tends to keep the attention of the student more fully, than merely listening to the source of a disease, the vectors, etc.

In the first semester are also presented principles of maternal and child health, programs of school health, and of public health administration in general, at the local, state, and federal levels and even at the international level.

In the second semester, the course content is devoted to a discussion of Public Health Dentistry, starting with the basic concepts underlying dentistry in public health, historical development, and trends in the development of this sphere of activity. This is then followed by a discussion of specific oral disease entities, their epidemiology and public health significance, such as the epidemiology, control and prevention of dental caries, periodontal disease, and oral cancer. Progressing further into the field of dental public health, lectures are presented on the inception and organization of dental public health programs, survey techniques, and so forth, and a limited amount of principles of dental health education as related to the public health program. Finally, detailed explanations of specific programs in dental public health are presented.

In Temple University most of the students come from the New Jersey, Connecticut and Pennsylvania areas. We usually try to explore in greater detail the programs which are in existence in the various states from which the students hail, on the basis they usually will go back to their own states to practice and should have an idea of the types of programs in these various areas.

In addition to this one formal course in public health, the oral hygiene student at Temple University receives additional instruction in public health through other courses, such as those listed in the curriculum under first aid, public health problems, etc.

One of the recommendations of the Committee on Public Health has been that field trips be utilized as a method of instruction. In the course in public health at Temple this has not been feasible because of the large size of the class since the dental and oral hygiene groups are taught together. However, in the course in community health problems and other courses, field trips have been arranged and are continuing to be arranged to bring the students into contact with existing programs so that they can see the situation at first hand.

In Columbia University, the situation is slightly different. The formal

course in Public Health at Columbia is also given in the second year of the curriculum—and during this past year the oral hygiene students have had exactly the same lectures as the dental students, which I think is a good experience. At Columbia there is a school of public health in the Faculty of Medicine. This is one of the 11 or 12 schools throughout the country and is generally agreed to be one of the best. As a result, the lecture arrangements have been a little different.

While at Temple University one teacher gives all the lectures, at Columbia the lectures are spread among different people. For example, in the field of dental public health there are six lectures assigned, five specifically in the field of public health dentistry and one in the field of dental health education.

The other phases of public health, such as vital statistics, communicable disease control, environmental sanitation, child health, etc., are covered by lecturers who are outstanding authorities in their particular field, drawn from the faculty of The School of Public Health. As a result of this, the student receives a series of lectures by outstanding people, although the total number of lectures is smaller than in the course at Temple. In the curriculum in Oral Hygiene at Columbia, however, emphasis is placed on the public health program in other public health courses. For example, in the first year in one of the courses listed under oral hygiene curriculum at Columbia, reporting on dental literature and reading is asked for, particularly on dental hygiene and its relationship to public health. In other courses the students visit such places as the Washington Heights Health Center, the various community health centers, mental hospitals for the techniques of working on mental patients. Public health is also covered in such courses as case work and sociology, in which the students visit such places as a Family Relations Court.

In both schools consideration is given to the preparation of the oral hygiene student to obtain a license to teach in the public school systems in those states where it is required. In Pennsylvania the requirements are met by the School of Oral Hygiene at Temple University. One of the special considerations that everyone who is employed by official agencies in Pennsylvania is that they must have a course somewhere along the line on the history of Pennsylvania. In New York State, 18 semester hours of credit are given in courses required in the State of New York for licensing for dental hygiene teachers. The students are required to complete not less than 244 hours and this amounts to about one day each week in the last semester of the senior year, also allowing for travel time.

The problem as I see it in public health concerns itself not only with fundamentals of education in public health, but also with availability of personnel. It has been pointed out any number of times that there is an inadequate number of dental personnel available in this country to properly handle the public health problem as it exists in the dental health field.

Today the oral hygiene problem has been expanded throughout the country. It is unfortunate that at times and in certain areas it has been overexpanded. I feel that the proper training not only in the clinical field, but the relationship of the hygienist to the community in which she practices—whether she practices in the dental office or in the public health program—is a very important part of the over-all picture. While we are expanding the facilities for training of oral health students and oral hygienists, it is important for us not to forget it is extremely important to give them the proper training, orientation, and contacts with the public health movement.

I think it would be unwise to take the second year of the expanded oral hygiene program to over-emphasize some of the clinical training aspects. The second year certainly should enhance the student's clinical background, but advantage should be taken of the additional year of maturity which the girl will experience while she is in training to show her the ways in which she may be more helpful to the community as well as to the dentist and to herself.

One thorn of experience is worth a whole wilderness of warning.

—LOWELL

COLLEGE NEWS

University of Alabama:

Recent Appointments

Dr. J. F. A. McManus, professor of pathology and chairman of department; Dr. Albert E. Casey, professor of pathology; Dr. J. A. Cunningham, professor of pathology; Dr. A. G. E. Pearse, visiting professor of pathology; and Dr. S. B. Barker, professor of pharmacology.

Dr. William L. McCracken, associate professor of odontology; Dr. J. D. Bush, associate professor of pathology; Dr. J. W. Eversole, associate professor of pathology; Dr. Philip Hitchcock, associate professor of pharmacology.

Dr. James W. Woods, assistant professor of biochemistry; Dr. B. H. Bishop, assistant professor of pathology; Dr. L. S. Graham, assistant professor of pathology; Dr. R. W. Mowry, assistant professor of pathology; Dr. Walter F. Scott, assistant professor of pathology; Dr. Jack D. Emerson, assistant professor of physiology; Dr. R. L. Barnett, Jr., assistant professor of odontology.

Promotions

Dr. Beulah M. Hathaway, from instructor to associate professor of pathology; Dr. Polly Ayers, from assistant professor to associate professor of dentistry; Dr. Thomas H. Johnson, from assistant professor to associate professor of dentistry; Dr. Adeeb E. Thomas, from assistant professor to associate professor of dentistry; Dr. Walter J. Kyle, from instructor to assistant professor; and Dr. Charles W. Lokey, from instructor to assistant professor.

Dr. Hsien Wu, visiting professor of biochemistry, resigned as of December 31, 1953.

Harvard University:

Recent findings in basic dental research were discussed in a symposium held at the annual meeting of the American Association for the Advancement of Science. The symposium, co-sponsored by the International Association for Dental Research, took place at the Harvard School of Dental Medicine.

Participants represented the Universities of Alabama, Chicago and Rochester, Michigan State College, the National Institute of Dental Research and the Harvard School of Dental Medicine.

State University of Iowa:

Accreditation of the State University of Iowa's hospital dental service by the American Dental Association has been announced, thereby ranking Iowa with other institutions whose hospital dental services are recognized by the examining boards which certify dental specialists.

Under the direction of Dr. Merle Hale, clinical functions of the service provide both undergraduate and graduate training in oral surgery, with seven residents in the graduate program at the present time.

Indiana University:

A workshop on the teaching of Dental Materials was presented November 16-17 at Indiana University School of Dentistry. Forty teachers and dentists attended, representing thirty-two different institutions. Representatives from the Army, Navy, and Air Force were present. The second day of the course was devoted to an evaluation of newer dental materials and was open to the dentists of Indiana.

Recent Appointments

Dr. Frank R. Denny, for many years a part-time member of the department of prosthetics, has joined the faculty as a full-time professor of prosthetic dentistry.

Dr. Robert T. Wilson has joined the faculty as an instructor in crown and bridge.

Other appointments include, Miss Mar-

jorie L. Schwartz, instructor in dental materials, and Dr. Richard J. Schnell as research assistant in dental materials.

University of Montreal:

In Memoriam

Dr. Eudore Dubeau, one of the founders of the school and its Dean for forty years, passed away in October, 1953. Dr. Dubeau during his lifetime was very active in dental organizations; the Canadian Dental Association, Federation Dentaire Internationale and many other international dental groups.

Appointments

Dr. Harry M. Seldin, of New York City, as honorary professor.

Dr. J. Arthur Renaud, retired after 30 years of professorship, as "Professor emeritus."

Drs. Gerard de Montigny, head of the oral surgery, and Herve Deschenes, head of operative dentistry, to the Council of the Faculty.

Dr. Jean Yergeau as assistant professor in operative dentistry.

Dr. Camille Patenaude as full-time assistant professor in prosthetics.

Guest Lecturer

Dr. Paul Geoffrion, head of the orthodontic department, has been invited by the Ecole Dentaire de Paris and the University of Istanbul to give a series of lectures in France and Turkey this summer. He has been made an honorary member of the Turkish Dental Society.

New York University:

Dean Raymond J. Nagle was formally initiated into the College's branch of the Scientific Research Society of America on March 8, 1954.

Dr. Isaac Neuwirth, professor of pharmacology served as master of ceremonies. The initiation was conducted by Dr. Claus F. Hinck, Jr., assistant dean.

Dr. Richard Trauner, professor of dentistry and oral surgery at the University of Graz in Austria, has been at the College of Dentistry studying American dental techniques.

In the United States as a Fulbright scholar under the sponsorship of the College of Dentistry, Dr. Trauner will observe American methods of maxillo facial surgery.

More than 250 dentists attended the spring term "refresher" lectures held at the college. They were sponsored by the Alumni Association. The lectures were a review of the most modern techniques in dental prosthesis, the science of dental and oral restorations.

Drs. David H. Coelho and Joseph S. Landa served as lecturers and discussion leaders.

A two-year full-time postgraduate course in Periodontia and Oral Medicine in preparation for certification and teaching has been announced. One year full-time, two year half-time and four year half-time courses also are offered, starting September 20, 1954. These courses will be given by the Periodontia Faculty under the direction of Dr. Samuel Charles Miller.

Special postgraduate courses are offered during the month of June, 1954, on a daily 9-4 schedule as follows:

Periodontia, 123C	June 7-11
Periodontia 124	June 7-25
Complete Denture Prosthesis	June 7-18
Partial Dentures	June 7-18
Pulp-canal Therapy	June 7-18

For information write the Secretary, Postgraduate Division.

University of North Carolina:

Graduate programs in orthodontics, oral surgery, and pedodontics, leading to a Master's Degree or a certificate are announced. The graduate programs in orthodontics and pedodontics require 15 months in residence, while 24 months are required in oral surgery. The curriculum is planned

to meet the educational and experimental requirements for the respective specialty boards. Students are admitted in orthodontics and pedodontics in June each year, while admission for the study of oral surgery is scheduled for September.

A series of postgraduate courses to be offered this summer are announced as follows:

Dentistry for Children I	July 12-16
*Dentistry for Children II	July 19-23
Endodontics	June 21-25
Endodontics (same as above but one day per week)	June 30, July 7, 14, 21 and 28
Periodontology and Oral Pathology	June 14-16
Operative Dentistry	June 12

*Successful completion of Dentistry for Children I is required for enrollment in II.

For information write the Department of Postgraduate Dental Instruction.

University of Pittsburgh:

The Seventh Annual Dental Health Conference, sponsored jointly by the School of Dentistry and the Odontological Society of Western Pennsylvania, was held in Pittsburgh's Mellon Institute on April 28, 1954. The conference consisted of two themes, "Dental Care for the Child" and "The Psychiatrist Looks at Dentistry." The program consisted of two speakers on each topic, each followed by a panel discussion.

Dental care for children from the viewpoint of the pediatrician was presented by Warren R. Sisson, M.D., Forsythe Dental Clinic. John C. Brauer, D.D.S., University of North Carolina, considered the subject as viewed by the pedodontist.

Benjamin Spock, M.D., University of Pittsburgh, discussed psychiatry and dentistry for children. Frederick L. Weniger, M.D., University of Pittsburgh, presented psychiatry and dentistry for the adult.

The conferences, begun in 1948, have considered such subjects as prevention and control of dental caries, extension of dental care, fluoridation of community waters, periodontal disease, oral pathology, focal infection, oral manifestations of systemic disease, and advances in the etiology of dental caries. Last year, sugar and dental caries was the main topic.

Temple University:

A two-weeks postgraduate course in Orthodontia beginning January 23, 1955, under the direction of Dr. Robert H. W. Strang has been announced.

This course is given to practicing orthodontists only. The cost will be $200.00, exclusive of instruments and books.

Applications should be sent to Dr. Louis Herman, Director of Postgraduate Studies.

University of Tennessee:

Recent Appointments

Dr. Joe H. Morris, as assistant professor in oral medicine and surgery.

Dr. Robert F. Taylor, as instructor in operative dentistry.

Dr. Donald J. Bellott, as assistant in operative dentistry.

Dr. Ruben P. Robinson, as assistant in complete denture prosthesis.

Dr. Chester Lloyd, assistant professor in operative dentistry and director of the postgraduate program in pedodontics has been elected president-elect of the Memphis Section, Tennessee Unit, American Society of Dentistry for Children.

Tufts College:

Announcement is made of a course on Full Denture Implants every Wednesday as listed: September 15, 22, 1954; October 13, 20, 27, 1954. Tuition $200.00. The course, under the direction of Drs. Norman I. Goldberg and Aaron Gershkoff, will be taught by lecture, demonstration and conference.

A practical case will be carried through demonstrating the bone impression and the actual insertion of a full denture implant, along with the completion of the prosthesis.

For information write Dr. Irving Glickman, Director of Postgraduate Studies.

BOOK REVIEWS

Periodontia, by Henry M. Goldman, D.M.D. Third edition, 790 pages, 525 illustrations, 12 in color. C. V. Mosby Co., St. Louis, 1953, $16.00.

Dr. Goldman's book is particularly directed to the undergraduate student. Keeping his audience in mind he has also followed the principle that a textbook is primarily an aid to a teacher and therefore should cover basic principles with sufficient leeway for discussion and augmentation by the instructor.

The order and arrangement of the material covered is excellent, leading the student carefully from the anatomy, histology and physiology of the periodontium, through the pathology, to a consideration of the multiple etiologic factors. The text in these phases is well written and readily assimilated by the undergraduate student. The photo-micrographs, illustrating salient points, are well selected and excellently reproduced.

Treatment of the complicated problem of etiology and diagnosis is well done. He has been careful to enumerate the known contributing factors and their relation to reasonably well-established clinical entities without an undue garnishment of philosophical concepts.

Dr. Goldman's handling of the pedagogy in examination, treatment planning and prognosis is sufficient, allowing for individual ideas of the instructor in charge and peculiarities of clinical procedure and patient handling in any particular school.

The description of therapeutic techniques involved is arranged in an orderly sequence, all bearing upon the resolution of specific problems. Dr. Goldman has properly emphasized that all techniques are available with proper treatment planning and their selection is dependent upon proper evaluation of results of the individual patient's response. This is an important milestone in the progress of periodontology as a science, since treatment must depend upon a knowledge of the physiology and pathology of the periodontium and be intelligently applied to a particular patient.

The discussion of occlusion and equilibration is adequate for the undergraduate student in giving him a basic concept of this important and yet controversial subject. One would expect this subject to be enlarged if the book is to be used by the specialist or the graduate student. There is missing in this book, as it is in many, a separate chapter or at least a comprehensive discussion of roentgenologic interpretation.

The chapter on diseases of the oral cavity is sufficient for a text book in periodontia, it does not pretend or begin to cover the subject but I feel that it is well placed. The text throughout the book is well written and easy to understand, with a more than adequate bibliography. The book is particularly well printed.

—Harold G. Ray.

Year Book of Dentistry, 1953-1954 Series. 493 pages, 337 illustrations. Year Book Publishers, Inc., Chicago. Price $6.00.

Articles concerned with all phases of dentistry have been selected from the world's dental literature received by the editors between September, 1952, and August, 1953. Stanley D. Tylman, Donald A. Keys, John W. Knutson, Harold J. Noyes, Hamilton B. G. Robinson and Carl W. Waldron have edited over 300 articles and included them in condensed form under seven major sections: Diagnosis, Pulpal and Periodontal Diseases and Related Pathology, Caries, Public Health, Orthodontics, Surgery and Relate Pathology and Restorative and Prosthetic Dentistry.

This digest in one volume undoubtedly

makes available to the busy dentist or teacher information which he would lack the time to obtain if he were obliged to peruse the dental periodicals individually. The keynote of the volume is the presentation of practical information and it, therefore, makes interesting, absorbing and informative reading for both the active practitioner and dental educator.

The book is well indexed, legibly printed, and handy in size, but uses a glossy paper which produces an unpleasant light reflection.

—Frederick A. Zulch.

Preventive Dentistry, by Joseph C. Muhler, D.D.S., Ph.D., Maynard K. Hine, D.D.S., M.S., and Harry G. Day, Sc.D. 336 pages, 56 illustrations. C. V. Mosby Co., St. Louis, February, 1954, $8.50.

This text is a succinct presentation of the many factors involved in the field of preventive dentistry and will constitute a most welcome addition to the professional libraries of dentist, physician and public health worker. It has assembled much of the material which they would like to have at their finger tips.

Here is the fulfillment of a basic need in the field of dental education for both the student and the instructor. Those who have spent long hours searching the indexes for elusive research articles and days and weeks in the laborious pursuit of digesting and sifting the often magniloquent presentations, will immediately grasp the value of this concise accumulation of mamaterial.

The first few pages are devoted to an introduction to the problem of preventive dentistry with emphasis on the prevalence of dental disease, the need for greater dental manpower, prevention as the answer, the basic concept of preventive dentistry and a plea for the inclusion of preventive dentistry, as a course entity, in the dental school curriculum.

To refresh the memory of the reader and to bring him to current status, the next presentation is that of histology, pathology and calcification of the specialized dental structures. Attention is here directed to hypoplasia of the enamel, hereditary opalescent dentin, mottled enamel, premature eruption and abnormalities of structure. This is followed by a discussion of the dynamics of enamel and dentin, with a comprehensive review of the investigation in this field utilizing radioactive tracers.

The great bulk of the publication is then devoted to the field of dental caries with chapters devoted to the diagnosis and evaluation of dental caries, natural resistance, tests for caries activity, effects of bacteriostatic agents, quinones, nitrofurans and impregnation, refined carbohydrates, fluorine, a seventeen page discussion of the preventive aspects of nutrition, the prevention of periodontal disease and the prevention of fatalities from cancer of the oral cavity.

Although it has been the policy of the Indiana group to close their chapters with a summary of the pertinent data therein presented, it is worthy of note that their primary intent is to establish within the reader an intimate understanding of the findings of the investigations they review. The relatively large number of direct quotations from original articles provides a more direct contact with the viewpoints of the original workers and obviates misunderstandings which can easily arise from the rewording of an original presentation.

There is a most valuable discussion of prophylactic methods with some basic concepts upon which subsequent preventive techniques may be based, but the greatest value of this work lies in the fact that it furnishes a wealth of useful factual material for the interested student or practitioner who does not have access to a dental library or cannot afford the time necessary for a review of the literature.

For the reader who is interested in a

more minute investigation of any phase of this work, a bibliography of 676 sources is presented and an excellent authors' index is provided. It would be most difficult to select any health profession, the members of which would not derive inestimable return from the study of this volume.

—Ira L. Shannon.

Mayo Clinic Diet Manual, by The Committee on Dietetics of The Mayo Clinic. Second edition; 247 pages, no illustrations. W. B. Saunders Co., Philadelphia, 1954, $5.50.

This is the first revision of this manual which was first published in 1949. The revision is based on the latest information on foods, vitamins and current dietary practices at the Mayor Clinic. As the Committee of Dietetics of the Mayo Clinic states, other revisions undoubtedly will be necessary in the future because "the science of nutrition is continuing to develop and knowledge of disease is making rapid headway so that many of the dietary recommendations of today will soon be out of date."

The manual is compiled primarily for physicians and dietitians, but dentists who have patients under the care of physicians for diabetes, gastric or duodenal ulcers or any of the other diseases with special dietary problems, which may complicate a dental-nutrition program, will find in the manual much information of help in the dental-medical treatment of these patients.

The comment in the preface that "It is essential that the food served be eaten if the diet is to be of value to the patient" applies to the dental problems of the patient as well as to the medical problems. A diabetic patient who is not well controlled can be as serious a problem to the dentist as to the physician. Unless a patient with an ulcer takes ascorbic acid in some form, his oral mucosa will become a problem for the patient and for his dentist.

The information in the manual is concise, practical, well organized and there is an excellent index. It contains many tables giving special information about foods. Tables usually add to publication costs. This is not intended as a criticism, but since the manual costs only $5.00, it is understandable why an inexpensive plastic spiral-type back was used. From a practical standpoint the manual will have to be handled with care, otherwise some of the pages will soon be detached.

—Nina Simmonds.

Your Wonderful Teeth, by G. Warren Schloat, Jr., 48 pages, 97 illustrations. Charles Scribner's Sons, New York, 1954, $2.25.

"Your Wonderful Teeth" is written for children, parents, and teachers of children. Its effective use would be in dental and medical doctors' reception rooms, children's libraries, schools, and homes.

Its general content is told in the four chapter titles:

I. Why you have teeth.
II. Andy meets the dentist.
III. Warren meets a special dentist (Orthodontist).
IV. Why you must clean your teeth.

The story is told with many pictures and a few words. This quality makes it usable by a wide age level range of children, i.e., 2-15 years, with varying degrees of effectiveness.

The author is the father of the two boys in the story, an artist, a photographer, and an author of five other photographic books for children.

Mr. Schloat's material presents the wonder and value of teeth to the child. It presents dental care for children in a friendly light. It could motivate children to better home and professional care of their mouths.

In general the material is essentially correct and well presented. "Your Wonderful Teeth" should find wide practical acceptance among doctors, teachers and parents interested in the pedodontic problem.

—Kenneth L. McKinnon.

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Address all correspondence relating to manuscripts and copy for publication in this JOURNAL to the editor, Dr. Charles W. Craig, University of California Medical Center, College of Dentistry, San Francisco 22, California.

Address correspondence concerning subscriptions to the JOURNAL and advertising space to the business manager, Dr. Charles A. Scrivener, College of Physicians and Surgeons, School of Dentistry, 344 Fourteenth Street, San Francisco 3, California.

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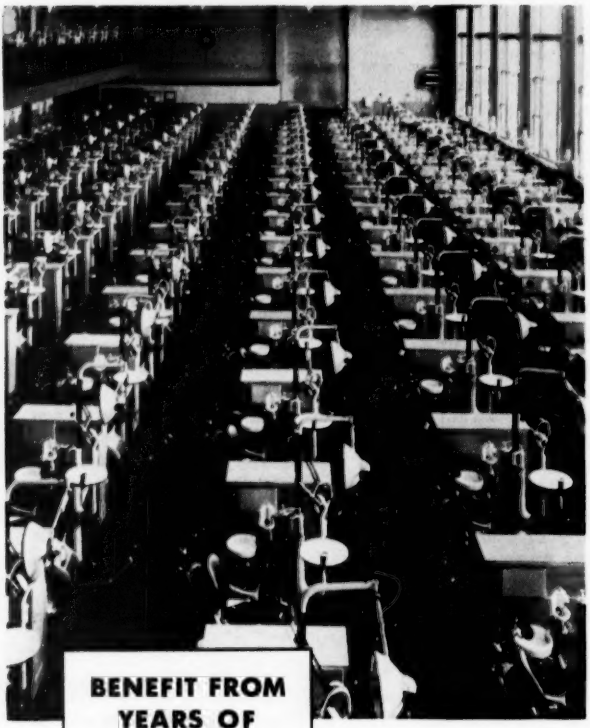

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